

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office Date: 3/12/2012
Project Manager: Anish Gautam Phone Number: 916-327-2382
Office: Energy Efficiency Research Office Division: Energy Research and Development MS- 51
Project Title: Low-Cost, Scalable, Fast Demand Response for Municipal Wastewater and Recycling Facilities

Type of Request: (check one)

[X] New Agreement: (include items A-F from below) Agreement Number: PIR-11-007
Program: PIER E / Industrial/ Ag/ Water
Solicitation Name and/or Number: PON-11-501-74 (2011 Emerging Technology Demonstration Grant Program (ETDG II))
Legal Name of Recipient: AutoGrid Systems, Inc.
Recipient's Full Mailing Address: 960 SAN ANTONIO RD STE 201 PALO ALTO, CA 94303-4921
Recipient's Project Officer: Chris Knudsen Phone Number: 925-876-5908
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-E Amount: \$ 1,199,544.00 Statute: 10- FY: 11-12 Budget List #: 501.0271
*Source #2: Amount: \$ Statute: FY: Budget List #:
*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: 5/9/2012 [] Consent [X] Discussion
Business Meeting Participant: Anish Gautam 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-11-007 for a grant in the amount \$1,199,544.00 with AutoGrid Systems, Inc. to demonstrate the use of its Demand Response Optimization and Management System (DROMS) platform at two industrial facilities. This will allow industrial customers to participate in traditional demand response (DR) programs targeted at reducing peak demand, and emerging DR programs designed to provide fast ancillary services to the grid to support large-scale integration of renewable generation. The length of this agreement is 33 months. (PIER electricity funding.) Contact: Anish Gautam (5 minutes)

Project Manager Date Office Manager Date Deputy Director Date

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TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Planning and System Design
3	X	System Installation, Configuration, and Testing
4		Open Loop Data Collection, Optimization, and Verification
5		Closed Loop Data Collection, Machine Learning Optimization, and Verification
6	X	Pilot Activities
7		Technology Transfer Activities
8	N/A	Production Readiness Plan

GLOSSARY

Term/ Acronym	Definition
CAISO	California Independent System Operator
Energy Commission	California Energy Commission
CPP	Critical Peak Pricing
CPR	Critical Project Review
CPUC	California Public Utilities Commission
DR	Demand Response
DROMS	Demand Response Optimization and Management System
GW	Gigawatts
M&V	Measurement and Verification
MW	Megawatts
OpenADR	Open Automatic Demand Response
PAC	Project Advisory Committee
PG&E	Pacific Gas and Electric

Goals of the Agreement:

The goal of this Agreement is to demonstrate how industrial facilities such as wastewater treatment and recycling plants can provide fast demand response (DR) within California. The Recipient (Autogrid System Inc.) will demonstrate its Demand Response Optimization and Management System (DROMS) platform at a water pollution control facility and a recycling plant. The deployment of Open Automatic Demand Response (OpenADR2.0) at industrial facilities will act as an industry reference for OpenADR2.0 deployment within California.

This Agreement has the potential to transform energy transmission and distribution in

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California and the United States, and to improve grid reliability by enabling the deployment of DG. The knowledge and experience gained from the demonstrations conducted in this Agreement will allow the export of the technology from California to the rest of the world, resulting in significant job creation and revenue growth for the state.

Objectives of the Agreement:

The objectives of this Agreement are to:

1. Remove barriers to the adoption of DR through the installation of a cloud-based, open standard system that eliminates large upfront Information Technology expense and can scale to end-user requirements.
2. Configure an optimization machine learning engine to optimize energy use for industrial facilities.
3. Improve the predictive ability of available energy resources and reduce marginal procurement needs through the application of sophisticated modeling and time-series based analytics engines.

Results from this Agreement will be used to: predict energy and peak electrical demand savings, economic savings, and facility impacts of DR programs; and optimize various DR control strategies to achieve maximum peak demand reduction while maintaining facility functionality and meeting system operator needs.

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 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 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 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:

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- 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 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)

The 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)

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

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Manager to provide support to the Energy Commission.

The 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).
- 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.

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)

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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 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

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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 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.

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

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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.

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

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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 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 expenditure for which a permit is required.

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

Professional Advisory Committee (PAC)

Task 1.8 Establish the PAC

The goal of this task is to prepare an advisory committee for this Agreement. The PAC shall be composed of diverse professionals. The number can vary depending on potential interest and time availability. The Recipient's Project Manager and the

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Commission Project Manager shall act as co-chairs of the PAC. The exact composition of the PAC may change as the need warrants. PAC members serve at the discretion of the Commission Project Manager.

The Recipient shall:

- Prepare a draft list of potential PAC members that includes name, company, physical and electronic address, and phone number and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. This list will be discussed at the kick-off meeting and a schedule for recruiting members and holding the first PAC meeting will be developed.
- Recruit PAC members and ensure that each individual understands the member obligations described above, as well as the meeting schedule outlined in Task 1.9.
- Prepare the final list of PAC members.
- Submit letters of acceptance or other comparable documentation of commitment for each PAC member.

Products:

- Draft List of PAC Members
- Final List of PAC Members
- Letters of acceptance, or other comparable documentation of commitment for each PAC Member (no draft)

Task 1.9 Conduct PAC Meetings

The goal of this task is for the PAC to provide strategic guidance to this project by participating in regular meetings or teleconferences.

The Recipient shall:

- Discuss the PAC meeting schedule at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of PAC meetings shall be determined in consultation with the Commission Project Manager. This draft schedule shall be presented to the PAC members during recruiting and finalized at the first PAC meeting.
- Organize and lead PAC meetings in accordance with the schedule. Changes to the schedule must be pre-approved in writing by the Commission Project Manager.
- Prepare PAC meeting agenda(s) with back-up materials for agenda items.
- Prepare PAC meeting summaries, including recommended resolution of major PAC issues.

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Products:

- Draft PAC Meeting Schedule
- Final PAC Meeting Schedule
- PAC Meeting Agenda(s) with Back-up Materials for Agenda Items (no draft)
- Written PAC meeting summaries, including recommended resolution of major PAC issues (no draft)

TECHNICAL TASKS

The Recipient will prepare all deliverables 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 PLANNING AND SYSTEM DESIGN

The goal of this task is to define detailed Functional and Non-Functional requirements for the project and to complete detailed technical system installation for all components of the system at specific sites (a wastewater treatment plant and a recycling plant). This includes work to fully identify and optimize the site processes to the system(s).

The Recipient shall:

- Verify that the proposed demonstration sites (wastewater treatment plant and recycling plant) can host the project, or obtain a new suitable demonstration site. Submit a *Notification Letter* to the Commission Project Manager stating that the demonstration sites are available for the project.
- Enter into an agreement with a Measurement and Verification (M&V) contractor for the project. Submit a *Notification Letter* to the Commission Project Manager stating that the M&V contractor will participate in the project.
- Perform detailed site surveys capturing system interfaces, processes, and system requirements.
- Complete a *Functional and Non-Functional Requirements Document* for the project. The document shall include but not be limited to: non-functional criteria for success (such as communication latencies, throughput, and actuator response time), functional requirements (such as load shed within a specific timeframe with verification), and site-specific technical and business process requirements.
- Complete an overall system specification and configuration of: Simple Measurement and Actuation Profile (sMAP); Demand Response Optimization and Management System (DROMS); Demand Response

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sense (DRsense), Demand Response Quick Assessment Tool (DRQAT); and Demand Shifter, site Supervisory Control And Data Acquisition (SCADA), and control components of the system; as well as business and operational process design specific to the demonstration sites.

- Prepare a *Technical System Specification Document*, *System Installation Diagram*, and *System Business Process Diagram*.
- Complete the system interface to the California Independent System Operator (CAISO) and Pacific Gas & Electric Co. (PG&E).
- Prepare a *Total System Test Plan* that includes multiple test cases to test all relevant non-functional and functional requirements as defined within the Technical System Specification Document and Functional and Non-Functional Requirement Document.
- Prepare a *System Design Review Report* that includes but is not limited to a complete review of all technical, system, and business process designs. The report must be approved by the Recipient's key team members, including the Principal Investigator and Project Manager.

Products:

- Notification Letter Regarding Demonstration Site
- Notification Letter Regarding M&V Contractor
- Functional and Non-Functional Requirements Document
- Technical System Specification Document
- System Installation Diagram
- System Business Process Diagram
- Total System Test Plan (no draft)
- System Design Review Report (no draft)

TASK 3 SYSTEM INSTALLATION, CONFIGURATION, AND TESTING

The goal of this task is to install, configure, and test the system at the sites identified in Task 2. This includes system configuration and basic functionality testing across communications and control interfaces.

The Recipient shall:

- Develop a Third Party Hardware Selection Matrix.
- Complete the selection of third party hardware necessary for system installation and configuration.
- Procure third party hardware for a lab integration test.
- Procure third party hardware for site installation.
- Prepare a *Lab Integration Test Plan* that includes multiple test cases to

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- Build a Lab Integration Test Harness.
- Execute the Lab Integration Test Plan.
- Complete a *Lab Integration Test Design Review Report* that includes but is not limited to a complete review of lab performance data against the test plan. The Report must be approved by key team members.
- Revise the system configuration based on lab design review results.
- Prepare a *Site Installation Plan*.
- Complete site installation design review.
- Prepare a *Site Installation Test Plan* that includes but is not limited to multiple test cases to test all non-functional and functional requirements (as defined within the System Requirements Document) that are relevant to site installation.
- Perform site installation.
- Execute the Site Installation Test Plan. This will include testing and debugging installations.
- Complete PG&E and CAISO Integration.
- Prepare and execute a *Total System Test Plan*. Include test results in a *System Test Plan Report*.
- Complete a *Total System Design Review Report* that includes but is not limited to: a complete review of site installation test results; PG&E and CAISO interface test results; and test results against the Total System Test Plan. The Report must be approved by key team members.

Products:

- Third Party Hardware Selection Matrix
- Draft Lab Integration Test Plan
- Final Lab Integration Test Plan
- Site Installation Plan (no draft)
- Lab Integration Test Design Review Report (no draft)
- Site Installation Test Plan (no draft)
- System Test Plan Report (no draft)
- Total System Design Review Report (serves as the CPR Report) (no draft)

TASK 4 OPEN LOOP DATA COLLECTION, OPTIMIZATION, AND VERIFICATION

The goal of this task is to run the system over a defined period of time in an open loop mode to collect sensor data and configure the system, verify functionality for specific sites, and optimize a site-specific business process to the system.

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The Recipient shall:

- Prepare an *Open Loop Test Plan* that includes multiple test cases to test all non-functional and functional requirements (as defined within the Technical System Specification Document and Functional and Non-Functional Requirement Document) that are relevant to data collection across installed sensor points.
- Perform open loop data collection and analysis.
- Prepare an *Open Loop Test Report*.
- Prepare an *Open Loop Design Review Report* that includes but is not limited to a complete review of the results of data collection, analysis, and testing results. The Report must be approved by key team members.

Products:

- Open Loop Test Plan (no draft)
- Open Loop Test Report (no draft)
- Open Loop Design Review Report (no draft)

TASK 5 CLOSED LOOP DATA COLLECTION, MACHINE LEARNING OPTIMIZATION, and VERIFICATION

The goals of this task are to run the system over a defined set of time in a closed loop mode to optimize the configuration of the system, and to verify operation of control systems and the overall business process.

The Recipient shall:

- Prepare a *Closed Loop Test Plan* that includes but is not limited to multiple test cases to test all non-functional and functional requirements (as defined within the Technical System Specification Document and Functional and Non-Functional Requirement Document) that are relevant to the analysis and verification of closed loop functional and non-functional requirements.
- Perform closed loop data collection and analysis for configuration.
- Prepare a *Closed Loop Test Report*.
- Prepare a *Closed Loop Design Review Report* that includes but is not limited to a complete review of the results of data collection, analysis, and testing results. The report must be approved by key team members.

Products:

- Closed Loop Test Plan (no draft)
- Closed Loop Test Report (no draft)

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- Closed Loop Design Review Report (no draft)

TASK 6 PILOT ACTIVITIES

The goal of this task is to run the system in a full operational market participating mode for a period of at least nine months, including the hot summer months, to collect operational performance and grid benefit data.

The Recipient shall:

- Prepare a *Pilot Test Plan* that includes but is not limited to multiple test demand response cases to test all relevant non-functional and functional requirements (as defined within the Technical System Specification Document and Functional and Non-Functional Requirements Document) that are relevant to the fully operational functional and non-functional requirements.
- Perform pilot data collection and analysis.
- Prepare a *Pilot Test Report*.
- Ensure that the M&V contractor conducts M&V of installed DROMS system energy savings, economics, reliability and performance, and other parameters required by the CAISO and utilities.
- Ensure that the M&V contractor writes an independent *M&V Report* in accordance with Pilot Test Plan requirements.
- Prepare a *Pilot Design Review Report* that includes but is not limited to a complete review of the results of data collection, analysis, M&V results, and Pilot results. The report must be approved by key team members.

Products:

- Draft Pilot Test Plan
- Final Pilot Test Plan
- Draft Pilot Test Report
- Final Pilot Test Report
- M&V Report (no draft)
- Pilot Design Review Report (Serves as CPR report, 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 gained in this project will be made available to the public. The level of

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detail expected is least for research-related projects and highest for demonstration projects. Key elements from the plan shall be included in the Final Report.

- Conduct technology transfer activities in accordance with the Technology Transfer Plan. These activities shall be reported in the Monthly Progress Reports.

Products:

- Draft Technology Transfer Plan
- Final Technology Transfer Plan

TASK 8 PRODUCTION READINESS PLAN

The goal of this task is to determine the steps that will lead to the manufacturing of the technologies demonstrated 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's discussion should be proportional to the complexity of producing or commercializing the proposed product and its state of development. The plan shall include but not be limited to:
 - Identification of critical production processes, equipment, facilities, personnel resources, and support systems that will be needed to produce a commercially viable product
 - A discussion of internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, elements identified as design-critical, 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
- Prepare a *Scientific Paper* that describes the knowledge gained in this project and the data collected. Publish the paper in a relevant journal for public awareness.

Products:

- Draft Production Readiness Plan
- Final Production Readiness Plan
- Scientific Paper