

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office

Date: 4/3/2012

Project Manager: Steve Ghadiri

Phone Number: 916-327-1623

Office: Energy Systems Research Office

Division: Energy Research and Development

MS- 43

Project Title: Smart Grid High Concentration Solar Photovoltaic Integration

Type of Request: (check one)

New Agreement: (include items A-F from below) Agreement Number: PIR-11-017

Program: PIER E / Energy Technology Systems Integration

Solicitation Name and/or Number: PON-09-801-17 (American Recovery and Reinvestment Act of 2009 Cost Share for Selected FOAs)

Legal Name of Recipient: Burbank Water and Power

Recipient's Full Mailing Address: 164 W MAGNOLIA BLVD
BURBANK, CA 91502-1720

Recipient's Project Officer: Bruce Hamer Phone Number: (818) 238-3566

Agreement Start Date: 6/25/2012 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: _____

CEC has made CEQA finding described in CEC-280, attached

Funding Information:

*Source #1: PIER-E Amount: \$ 1,000,000.00 Statute: 10-11 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 Discussion

Business Meeting Participant: Steve Ghadiri Time Needed: 5 minutes

Agenda Notice Statement: (state purpose in layperson terms)

Possible approval of a Grant / Contingent Award to...

Possible approval of Agreement PIR-11-017 for a grant of \$1,000,000.00 to Burbank Water and Power to demonstrate integration of smart grid technologies to improve grid reliability and use of existing transmission assets, and to facilitate integration of renewable resources. This award will be cost share for the Recipient's \$20 million federal award under the American Recovery and Reinvestment Act of 2009. (PIER electricity funding.) Contact: Steve Ghadiri. (5 minutes)

Exhibit A WORK STATEMENT

TASK LIST

Task #	CPR	Task Name
1		Administration
2		Wi-Fi Communication Network
3		Meter Data Management System
4		Advanced Metering Infrastructure
5		System Architecture: Enterprise Service Bus Assessment
6	X	Asset Protection Management Program
7		Outage Management System
8		Distribution Automation
9		Distribution Management System
10		Customer Smart Choice Programs
11		Integrated Automatic Dispatch System
12		Thermal Energy Storage
13		Electrical Vehicle Charging Demonstration
14		Customer Information System
15		Power Operations Center
16		Burbank Microgrid Project

KEY NAME LIST

GLOSSARY

Term/ Acronym	Definition
ADS	Integrated Automatic Dispatch System
AMI	Advanced Metering Infrastructure
CIP	Critical Infrastructure Protection
CIS	Customer Information System
CPR	Critical Project Review
DA	Distribution Automation
DMS	Distribution Management System
DOE	United States Department of Energy
ESSN	Ethernet Switched Services Network
EV	Electric Vehicle
GIS	Geographic Information System
ISM	Integrated System Model
kV	Kilovolt
kW	Kilowatt

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Term/ Acronym	Definition
MDMS	Meter Data Management System
OMS	Outage Management System
PEV	Plug-in Electric Vehicle
PIER	Public Interest Energy Research
PV	photovoltaic
RD&D	Research, Development and Demonstration
SCADA	Supervisory Control and Data Acquisition
TES	Thermal Energy Storage

Problem Statement:

Fundamental changes are underway in the electric utility industry that will significantly increase the need for utilities to monitor and actively manage energy flow and use on their systems. Utilities are already experiencing challenges with customer-owned distributed resources and plug-in electric vehicles (PEVs). Additionally, customer-owned photovoltaic (PV) devices and energy storage devices can have a significant impact on the electrical grid. Through modernization and the development of a comprehensive, integrated and secure smart grid, electric utilities will be better able to manage the electric system, promote conservation, expand renewable resources, and increase reliability.

Goals of the Agreement:

The goal of this Agreement is to securely integrate multiple, intelligent Smart Grid infrastructure systems and control processes into Burbank Water and Power's electric system.

The Agreement will supplement an American Recovery and Reinvestment Act of 2009 grant received by the Recipient from the U.S. Department of Energy (DOE).

Objectives of the Agreement:

The primary objectives of this Agreement are to:

1. **Deploy a Secure Wi-Fi Mesh Network** – This wireless network will integrate with the existing Gigabit Ethernet over a fiber optic network, and will support the City of Burbank's water and electric utility, police and fire departments, and other customers.
2. **Implement a Meter Data Management System (MDMS)** – Deploy eMeter software and technology, and integrate it with the new Customer Information System (CIS) and processes.
3. **Install Advanced Metering Infrastructure (AMI) for all customers-** Install Trilliant/GE electric meters and collection system, Itron water meters and collection system, and integrate with MDMS and CIS.

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4. **Implement an Asset Protection Program** – Establish security for mission-critical and mission-essential assets. This program is divided into three parts: Energy Control Center (ECC)/Ethernet Switched Services Network (ESSN) Security, Critical Infrastructure Protection (CIP) Compliance, and Smart Grid Security.
5. **Implement an Outage Management System (OMS)** – Deploy OMS and integrate it with Smart Grid infrastructure and MDMS to alert staff of outages and provide data to facilitate faster field staff response and shorten outage duration and impacts.
6. **Utilize Distribution System Operation Model for Automating the Distribution System** – Utilize the new Smart Grid-enabled Integrated System Model to revise the 12-kilovolt (kV) feeders and demonstrate automatic sectionalizing and 4-kV and 12-kV circuit auto reclosers; and integrate the system with the existing Supervisory Control and Data Acquisition (SCADA) system and Geographic Information System (GIS).
7. **Implement Customer Smart Choice Programs** – Develop and implement retail service offerings enabled by Smart Grid infrastructure that promote energy efficiency, energy demand management, thermal energy storage, and PEV management.
8. **Implement an Integrated Automatic Dispatch System** – Develop and implement a comprehensive software solution for optimizing utilization of energy generation resources and demand-side management of customer energy consumption.
9. **Evaluate Thermal Energy Storage** – Develop, implement, and evaluate thermal energy storage systems to shift much of the energy consumed by customers' air conditioning units from on peak hours to off peak hours.
10. **Electrical Vehicle Charging Demonstration** – Deploy and evaluate various impacts associated with PEVs charging at city facilities, energy use, billing charges, home charging, and grid integration.
11. **Customer Information System** – Replace the existing CIS with a new system capable of supporting smart grid systems.
12. **Power Operations Center** – Design and build an operations center to provide a situational awareness environment with displays for all new smart grid communication and control systems.
13. **Burbank Microgrid** – Reconfigure electrical circuits and provide a microgrid to manage on-site generation resources and critical campus electrical loads, and provide continuous and reliable electrical operations during loss of the external power system.

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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 Agreement Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Agreement Manager, Agreement Administrator, Accounting Officer, and others designated by the Commission Agreement 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 Agreement 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 Commission Agreement Manager’s expectations for accomplishing tasks described in the Work Statement
- 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 Energy Commission Agreement 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 Agreement Manager Product:

- Kick-Off Meeting Agenda (no draft)

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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 Agreement Manager and as shown in the Task List above. However, the Energy Commission Agreement Manager may schedule additional CPRs as necessary, and any additional costs shall be borne by the Recipient.

Participants include the Energy Commission Agreement 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 Agreement Manager to provide support to the Energy Commission.

If the United States Department of Energy (DOE) is conducting similar meetings, the Recipient shall notify and invite the Energy Commission Agreement Manager to participate, either by teleconference or by actual meeting attendance. The DOE-required meetings may be used in place of the Energy Commission's CPR meetings, at the discretion of the Energy Commission Agreement Manager.

The Energy Commission Agreement 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

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- Present the required information at each CPR meeting and participate in a discussion about the Agreement.
- Provide copies of any DOE correspondence (emails, reports, letters, etc.) that relate to the project status. This includes copies of project performance reviews on Recipient's work and summaries and results of project review meetings with the DOE.

Energy Commission Agreement Manager Products:

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

Recipient Products:

- CPR Report(s) (no draft)
- DOE correspondence and reporting (no draft)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement. If the DOE is conducting a similar final meeting, the Recipient shall notify and invite the Commission Agreement Manager to participate, either by teleconference or by actual meeting attendance. The DOE-required meeting may be used in place of the Commission's final meeting, at the discretion of the Commission Agreement Manager. However, all items listed in this task will need to be covered in the meeting.

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 Commission Grants Office Officer, and the Commission Agreement 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 Commission Agreement 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 Commission Agreement Manager will determine the appropriate meeting participants.

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The administrative portion of the meeting shall be a discussion with the Commission Agreement 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.
- Copies of all correspondence and reports discussing DOE's findings on the project, and future disposition of the project, if applicable. When directed by the Commission Agreement Manager, recipient will provide copies of any DOE correspondence (emails, reports, letters, etc.) that relate to project performance.

Products:

- Written documentation of meeting agreements (no drafts)
- Schedule for completing closeout activities (no draft)
- DOE correspondence on project findings and results (no drafts)

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.

With Commission Agreement Manager approval, the Recipient can submit a DOE Progress Report in lieu of the required Commission report if contains the information listed in Exhibit A, Attachment A-2.

The Recipient shall:

- Prepare Monthly Progress Reports which summarize 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

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Agreement Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in the terms and conditions of this Agreement.

- Unless otherwise directed by the Commission Agreement Manager, each Progress Report must contain any reports made to the DOE, including summaries of meetings with the DOE, that relate to the project outcome and performance. Include names and contacts of DOE representatives.

Product:

- Monthly Progress Reports (no drafts)
- Copies of DOE reporting and meeting summaries (no drafts)

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 Final Report shall describe the following at a minimum: a) original purpose, approach, activities performed, results and conclusions of the work done under this Agreement; b) how the project advanced science and technology to the benefit of California's ratepayers and the barriers overcome; c) assessment of the success of the project as measured by the degree to which goals and objectives were achieved; d) how the project supported California's economic recovery in the near term and number of jobs created or sustained; e) how the project results may be used by California industry, markets and others; f) projected cost reduction impact and other benefits resulting from the project; g) discuss the project budget, including the total project cost and all the funding partners and their cost share; h) discuss how the Energy Commission funding was spent on the project, including any unique products and benefits; i) observations, conclusions and recommendations for further RD&D projects and improvements to the PIER project management process.

If a final report is required by the DOE, the Recipient shall include a copy of it along with the Energy Commission's final report requirements. In addition, the Recipient shall submit the draft final DOE report to the Energy Commission for review at the same time the Recipient submits it to the DOE.

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:

- Provide a draft copy of the Final Report including a copy of the draft submitted to the DOE in response to the American Recovery and Reinvestment Act Funding Opportunity Notice for which an award was received. The Final Report shall be completed on or before the end of the Agreement Term.

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- Submit written correspondence from the DOE regarding acceptance of the final report.

Products:

- Draft Final Report, including a copy of the draft report submitted to the DOE
- Final Report, including a copy of the final report submitted to the DOE
- Written correspondence from the DOE regarding acceptance of DOE final report (no draft)

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 Agreement 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,

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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 Agreement Manager if during the course of the Agreement additional match funds are received.
- Notify the Energy Commission Agreement 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 drafts)
- Letter(s) for new match funds (if applicable) (no drafts)
- 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 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 Agreement 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

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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 Agreement Manager.
- As permits are obtained, send a copy of each approved permit to the Energy Commission Agreement Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Energy Commission Agreement 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 drafts)
- Updated list of permits as they change during the term of the Agreement (if applicable) (no drafts)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable) (no drafts)

Task 1.8 DOE Reporting

The goal of this task is to provide other reports required by the DOE for this project.

The Recipient shall:

- Prepare quarterly metrics reports as required by the DOE.

Products:

- Quarterly Metrics Reports (no drafts)

TECHNICAL TASKS

Tasks 2, 4, and 7 have been completed prior to the execution of this Agreement with DOE and match funding. The Recipient must provide products for each completed task (as specified in the "Product" sections below) by the date specified in the Schedule of Products and Due Dates (Attachment A-1).

TASK 2 WI-FI COMMUNICATION NETWORK (COMPLETED)

The goal of this task was to design and implement a wireless mesh network to provide a communications backbone for such critical systems as the Advanced Metering Infrastructure (AMI) and Distribution Automation (DA) projects.

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The Recipient:

- Initiated a wide area network system and interfaced it with the fiber optic network.
- Installed Water AMI.
- Installed fiber optic connections at Wi-Fi Gateway radios.
- Installed a Wi-Fi Network Management System.
- Installed a fiber optic cable back haul system.

The Recipient shall:

- Prepare a Proof-of-Concept Report and submit it to the Energy Commission Agreement Manager. The report shall describe the design and implementation of the wireless mesh network.

Products:

- Proof-of-Concept Report (no draft)

TASK 3 METER DATA MANAGEMENT SYSTEM

The goal of this task is to manage information, workflow, and peak load for higher operational efficiencies and customer satisfaction.

The Recipient shall:

- Implement the eMeter EnergyIP MDMS system with a meter to cache functionality including system set-up and interfaces.
- Implement the interface between MDMS and the OMS, remote connect and disconnect functionality, and aggregate meter information.
- Integrate MDMS with a web-based customer portal, and implement demand-side management functionality that will work with the Energy Demand Management System and potentially other systems to monitor and balance customer load and generation resources identified in Task 10, Customer Smart Choice Programs.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

TASK 4 ADVANCED METERING INFRASTRUCTURE (COMPLETED)

The goals of this task were to install Trilliant electric meters and a wireless collection system, install Itron water meters and a collection system, integrate with the Wi-Fi network, and integrate with the MDMS and the CIS.

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The Recipient:

- Installed AMI meters for residential, commercial, and industrial electrical services.
- Installed AMI meters for water services.
- Integrated and tested data flow to MDMS and CIS.

The Recipient shall:

- Prepare a Summary of Task 4 Activities and submit it to the Energy Commission Agreement Manager.

Products:

- Summary of Task 4 Activities

TASK 5 SYSTEM ARCHITECTURE: ENTERPRISE SERVICE BUS ASSESSMENT

The goal of this task is to evaluate the reference architecture for operational servers and applications and determine if it is adequate for Smart Grid implementation or if an additional Enterprise Service Bus (ESB) is needed to complete the integration of Smart Grid applications.

The Recipient shall:

- Develop reference data architecture for operational servers and applications.
- Assess enterprise integration of communication systems, information technology, information systems, and networks.
- Procure and install an ESB (if necessary).
- Prepare an Enterprise Service Bus Assessment Report on the assessment of the ESB for smart grid implementation.

Products:

- Enterprise Service Bus Assessment Report (no draft)

TASK 6 ASSET PROTECTION MANAGEMENT PROGRAM

The goal of this task is to establish security for mission-critical assets.

The Recipient shall:

- Develop security policies and procedures.
- Perform an asset protection assessment for utility systems, and implement mitigating infrastructure, processes, and procedures.
- Develop security architecture.
- Deploy network security equipment and control systems.
- Prepare North American Electric Reliability Corporation (NERC) compliance documents to address all CIP Standards.

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- Centralize security and risk management processes.
- Report activities performed under this task in the Monthly Progress Reports.
- Submit a CPR Report and attend a CPR Meeting in accordance with Task 1.2.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

TASK 7 OUTAGE MANAGEMENT SYSTEM (COMPLETED)

The goal of this task is to permit automated outage notification from AMI meters to the OMS and process the meter outage information to calculate the probable outage boundaries and circuits or circuit components affected.

The Recipient:

- Developed and implemented an integration plan to provide outage status data to the OMS from the AMI system and MDMS.
- Reported activities performed under this task in the Monthly Progress Reports.

The Recipient shall:

- Prepare a Summary of Task 7 Activities and submit it to the Energy Commission Agreement Manager.

Products:

- Summary of Task 7 Activities

TASK 8 DISTRIBUTION AUTOMATION

The goal of this task is to develop and implement a system of automated switches, advanced relay protection, and other devices that will allow for automatic operation and remote control of the electric distribution system.

The Recipient shall:

- Update and complete all electric system field and station assets in the GIS.
- Implement a GIS-compatible Integrated System Model (ISM).
- Perform staff development for system analysis and planning, acquired through the evaluation of the new ISM.
- Conduct engineering studies using the ISM for the precise monitoring and control of the distribution system at the feeder level.
- Deploy a DA pilot study consisting of automating at least three feeder circuits with cross-ties between two substations.

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- Upgrade the feeder breaker relay protection from electromechanical to microprocessor type on both 4kV and 12kV feeders, and implement circuit auto-reclosers.
- Construct miscellaneous station automation projects to modernize station systems.
- Update the SCADA system to the latest version to enable compatibility with new smart grid control systems.
- Jointly with Task 9, incorporate the automated device data into the Distribution Management System (DMS).
- Jointly with Task 9, ensure proper connectivity between the SCADA system and the DMS.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

TASK 9 DISTRIBUTION MANAGEMENT SYSTEM

The goal of this task is to develop and implement a software and hardware system to more precisely model, monitor, and control the electric distribution system. The DMS will put in place an electric system model that displays connectivity of load, locations of distributed generation, and geographic coordinates for all components of the distribution circuits via GIS and will provide real-time analytical tools and system controls to mitigate distribution circuit overloads and prevent potential outages, optimize voltage control, minimize system losses, and maximize the utilization of distribution capital investment.

The Recipient shall:

- Jointly with Task 8, upgrade GIS Records to an accuracy level of 98 percent or more to use as a basis for developing an Integrated System Model (ISM).
- Jointly with Task 8, select and implement a DMS application. Integrate the DMS with SCADA, OMS, GIS, and Work & Asset Management (WAM) systems.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

TASK 10 CUSTOMER SMART CHOICE PROGRAM

The goal of this task is to implement multiple consumer-focused programs that will promote end user conservation, energy efficiency, and customer satisfaction.

The Recipient shall:

- Prepare OPower Home Energy Reports providing household-specific and “neighbor” comparative energy use information. Provide a Home Energy Report to the Commission Agreement Manager.

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- Provide online extension of the OPower Home Energy Reports.
- Implement a pilot program of 1,000 residential accounts with in-ground swimming pools to assess the performance of allowing customers to see real-time electric consumption in the home (the Terra Trim program).
- Prepare an Analytical Comparison Report of the OPower Home Energy Reports and the Terra Trim program.
- Implement a Customer Web Portal for energy and water usage reporting.
- Analyze various residential pricing methodologies.
- Conduct feasibility studies of demand management options such as programmable thermostats, air conditioning cycling programs, and other peak shifting control programs.
- Implement a demand response program for commercial and industrial customers.

Products:

- Home Energy Report (no draft)
- Analytical Comparison Report (no draft)

TASK 11 INTEGRATED AUTOMATIC DISPATCH SYSTEM

The goal of this task is to develop and implement a comprehensive software solution for optimizing utilization of energy generation resources and demand-side management of customer energy consumption. The integrated automatic dispatch system (ADS) is a real-time control system capable of automatically dispatching generation resources, customer demand (loads), distributed generation, and distributed storage (e.g., PEV batteries) as needed.

The Recipient shall:

- Deploy a comprehensive demand response and distributed energy resource management system.
- Deploy an Automatic Dispatch Function that performs an economic analysis of supply and demand resources to advise a preferred dispatch schedule.
- Deploy the Marginal Price Forecast software that provides wholesale electricity market pricing information to operations personnel.
- Deploy a Power Management System that provides critical information for electric system operations.
- Develop an ADS interface with the Ice Energy thermal energy storage system.
- Ensure the integration and proper operations of all systems.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

Exhibit A WORK STATEMENT

TASK 12 THERMAL ENERGY STORAGE

The goal of this task is to implement a thermal energy storage (TES) system to shift much of the energy consumed by customer air conditioning units from on peak hours to off peak hours. This shift reduces the required energy generation over the system peak and allows use of more efficient and lower cost resources to provide energy across the system peak.

The Recipient shall:

- Install TES units in Burbank Water and Power's service territory.
- Install two megawatts of additional TES units at select customer premises.
- Analyze efficiencies, energy consumption, and other relevant data.
- Prepare a Thermal Energy Storage Analysis Report on the performance of the thermal energy storage system.

Products:

- Thermal Energy Storage Analysis Report (no draft)

TASK 13 ELECTRICAL VEHICLE CHARGING DEMONSTRATION

The goal of this task is to conduct electric vehicle (EV) charging demonstrations and collect electric usage data to inform future engineering and billing practices.

The Recipient shall:

- Evaluate the use of charging stations in Burbank Water and Power's service territory.
- Evaluate the integration of charging stations into the utility grid.
- Evaluate PEV use in vehicle-to-home charging stations.
- Prepare an EV Charging Assessment Report.

Products:

- EV Charging Assessment Report (no draft)

TASK 14 CUSTOMER INFORMATION SYSTEM

The goal of this project is to replace CIS with a new system capable of interfacing and supporting smart grid systems and data feeds from multiple sources, including time of use and real-time pricing rate structures, demand response programs, net metering and advanced customer interaction via web portals, and social media mobile computing devices.

The Recipient shall:

- Evaluate CIS system requirements and options.
- Procure and install a new CIS in Burbank Water and Power's service territory.

Exhibit A WORK STATEMENT

- Integrate CIS with the MDMS, ADS, SCADA system, and other key information systems.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4)

TASK 15 POWER OPERATIONS CENTER

The goal of this task is to design and build a power operations center in Burbank Water and Power's service territory that hosts an energy control center and generation plant control systems. The center will provide a situational awareness environment with displays for all new smart grid communication and control systems to optimize grid and generation resource operations and management.

The Recipient shall:

- Evaluate operation center requirements and control system integration.
- Perform building improvements to integrate the new power operations center into existing facilities.
- Provide a situational awareness environment for grid and power plant operations personnel in the new power operations center.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).

TASK 16 BURBANK MICROGRID PROJECT

The goal of this project is to reconfigure electrical circuits, provide a microgrid to manage on-site generation resources and critical campus electrical loads, and provide continuous and reliable electrical operations during loss of the external power system. The microgrid will be capable of isolating itself from the power grid in advance of a power grid collapse, operate in an islanding mode, and be capable of starting on-site generating stations with only on-site power sources, i.e., black-start, on-site resources.

The Recipient shall:

- Evaluate the microgrid energy resources, load requirements including critical loads, operational contingencies, and microgrid requirements.
- Design and construct the microgrid and its control systems and integrate with power resources and relay protection equipment.
- Demonstrate new relay protection equipment.
- Report activities performed under this task in the Monthly Progress Reports.

Products:

None. Data from this task will be included in the Monthly Progress Report (Task 1.4).