

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office

Date: 2/27/2013

Project Manager: Jason Harville

Phone Number: 916-327-1541

Office: Energy Generation Research Office

Division: Energy Research and Development

MS- 43

Project Title: Energizing Our Future: Community Integrated Renewable Energy (CIRE) Assessment

Type of Request: (check one)

New Agreement: (include items A-F from below) Agreement Number: PIR-12-010

Program: PIER E / Renewables

Solicitation Name and/or Number: PON-12-502-46 (Community Scale Renewable Energy Development,

Legal Name of Recipient: Department of the Environment- City and County of San Francisco

Recipient's Full Mailing Address: 1455 MARKET ST. STE. 1200
SAN FRANCISCO, CA 94103-1331

Recipient's Project Officer: Danielle Murray Phone Number: 415-355-3715

Agreement Start Date: 6/24/2013 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: \$ 300,000.00 Statute: 11- FY: 12-13 Budget List #: 501.027J

*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: 5/8/2013 Consent Discussion

Business Meeting Participant: Jason Harville Time Needed: 5 minutes

Agenda Notice Statement: (state purpose in layperson terms)

Possible approval of a Grant / Contingent Award to...
 DEPARTMENT OF THE ENVIRONMENT- CITY AND COUNTY OF SAN FRANCISCO. Possible approval of Agreement PIR-12-010 with the Department of the Environment- City and County of San Francisco for a \$300,000 grant for the development of a community-specific renewable energy development plan for San Francisco's Central Corridor Eco-District. This agreement will include \$300,000 in match funding. (PIER electricity funding.) Contact: Jason Harville. (5 minutes)

GRANTS/CONTINGENT AWARD REQUEST



Project Manager	Date	Office Manager	Date	Deputy Director	Date
------------------------	-------------	-----------------------	-------------	------------------------	-------------

Exhibit A Scope of Work

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Study Distributed Generation on the Secondary Network
3	X	Study Enabling Technologies
4		Study Energy Storage and Generation
5		Research the District Thermal Energy Concept
6		Perform Data Collection and Analysis
7		Perform Technology Transfer Activities

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Danielle Murray (Department of the Environment – City and County of San Francisco)	Arup Group Limited	
2			- Pacific Gas and Electric Company - NRG
3			Same as above
4			
5			
6			
7			

GLOSSARY

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

Term/ Acronym	Definition
CCSF	City and County of San Francisco
CIRE	Community Integrated Renewable Energy
CPM	Commission Project Manager
CPR	Critical Project Review
DG	Distributed Generation
NRG	An energy company with a location in San Francisco
PG&E	Pacific Gas and Electric Company
EPA	United States Environmental Protection Agency

Exhibit A

Scope of Work

Problem Statement:

Research in the emerging microgrid market has mostly focused on contiguous campus or military base applications, where one owner develops its own localized system. While facilities such as these have served as early adopters for microgrid and community-scale renewable technologies, they constitute only a small portion of California's electricity demand. Reaching the California Governor's goal of 12,000 megawatts of additional localized energy generation by 2020 requires additional models such as the Community Integrated Renewable Energy (CIRE) model, which can be applied to a wider range of communities.

Though the City of San Francisco has taken steps towards meeting the goal of robust combined heat and power-based district energy systems, the work remains scattered and lacks an institutional advocate with a mandate to move the work towards implementation. This is due largely to the various interested agencies' uncertainty regarding short- and long-term next steps and which entity is most appropriate to assume an institutional advocate role. These problems exist in municipalities throughout the state.

Community-scale smart grid/ microgrid-controlled renewable energy integration has never been undertaken in a multiple stakeholder effort because of the current barriers to implementation that this project will address. This project will determine the feasibility of taking such a bold step, which will create significant development opportunities in California and around the globe. One unique component of the CIRE system is that it requires the distribution of energy resources to multiple stakeholders across public rights-of-way. The up-front pre-development activities will address the following significant barriers and knowledge gaps to this approach:

- Regulatory hurdles such as electricity distribution to multiple stakeholders, and across public rights-of-way (which traditionally triggers utility regulation in California);
- Energy dispatch across public rights-of-way to multiple stakeholders;
- Grid control across a non-continuous land boundary to multiple stakeholders;
- Smart grid/ microgrid demonstration outside of university or publicly-funded institutions.

Goals of the Agreement:

The goal of this Agreement is to investigate options and create a roadmap for integrating existing energy systems, renewable energy, and enabling technologies into a district energy system that will serve multiple stakeholders including businesses and owners of municipal and residential properties.

Objectives of the Agreement:

The objectives of this Agreement are to:

Exhibit A Scope of Work

- Study the regulatory challenges of community-scale smart grid/microgrid controlled renewable energy.
- Identify suitable electricity and heat technologies/systems that can be developed to share the thermal and electrical energy of communities.
- Determine the size and business case opportunities for local renewable energy generation. This includes:
 - Calculation of a business case in a community environment, applicable statewide; and
 - Identification of local opportunities that appear to be feasible to develop in the short term.
- Explore district energy opportunities such as potential cogeneration projects, ground source geothermal projects, and other district energy concepts.
- Disseminate project findings to a broad audience including urban planners and policy makers.

TASK 1 ADMINISTRATION

Instructions for Submitting Electronic Files and Developing Software

Electronic File Format

The Recipient will deliver an electronic copy (CD ROM or memory stick or as otherwise specified by the Commission Project Manager (CPM) of the full text of any Agreement products in a compatible version of Microsoft Word (.doc).

The following describes the accepted formats of electronic data and documents provided to the Energy Commission as products and establishes the computer platforms, operating systems, and software versions that will be required to review and approve all software deliverables.

- Data sets will be in Microsoft (MS) Access or MS Excel file format.
- PC-based text documents will be in MS Word file format.
- Documents intended for public distribution will be in PDF file format, with the native file format provided as well.
- Project management documents will be in MS Project file format.

Software Application Development

If this Scope of Work includes any software application development, including but not limited to databases, websites, models, or modeling tools, the Recipient will use the following standard Application Architecture components in compatible versions:

- Microsoft ASP.NET framework (version 3.5 and up) Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.

Exhibit A Scope of Work

- Visual Studio.NET (version 2008 and up) Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures Recommend 2008 R2.
- Microsoft SQL Reporting Services Recommend 2008 R2
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the Energy Commission's Information Technology Services Branch.

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 CPM, 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 CPM to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the CPM 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) *No work may be performed until this documentation is in place.*
- Permit documentation (Task 1.7)
- Discussion of subcontracts needed to carry out project (Task 1.8)

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

- The CPM'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 CPM shall designate the date and location of this meeting.

- Submit an updated Schedule of Products, List of Match Funds, and List of Permits to the CPM.

Recipient Products:

- Updated Schedule of Products
- Updated List of Match Funds
- Updated List of Permits

Commission Project Manager Product:

- Kick-Off Meeting Agenda

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 CPM and the Recipient. The CPM may schedule CPRs as necessary, and CPR costs will be borne by the Recipient.

Participants include the CPM and the Recipient, and may include the Commission Grants Officer, the Energy Research and Development Division technical lead, other Energy Commission staff and Management, and any other individuals selected by the CPM 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 or may be conducted via electronic conferencing (e.g., WebEx), as determined by the Commission Project Manager.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion of 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 so whether modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. If the CPM concludes that satisfactory

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 products 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 on the project. This report shall be submitted along with any other products identified in this Scope of Work. The Recipient shall submit these documents to the CPM 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
- Schedule for written determination
- Written determination

Recipient Product:

- CPR Report(s)

Task 1.3 Final Meeting

The goal of this task is to close out this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present the project 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 CPM. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the discretion of the CPM.

The technical portion of the meeting shall involve the presentation of an assessment of the degree to which project and task goals and objectives were achieved, in addition to findings, conclusions, recommended next

Exhibit A Scope of Work

steps (if any) for the Agreement, and recommendations for improvements. The CPM will determine the appropriate meeting participants.

The administrative portion of the meeting shall involve a discussion with the CPM and the Grants Officer about the following Agreement closeout items:

- Disposition of any equipment purchased with Energy Commission funds
- 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
- Final invoicing and release of retention
- Prepare written documentation of any agreements made between the Recipient and Commission staff during the meeting.
- Prepare a schedule for completing the closeout activities for this Agreement.

Products:

- Written documentation of meeting agreements
- Schedule for completing closeout activities

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 that 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 CPM 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.

Exhibit A Scope of Work

- In each Monthly Progress Report and invoice, document and verify:
 - Energy Commission funds received by California-Based Entities (CBEs);
 - Energy Commission funds spent in California; and Match fund expenditures
 - Provide synopsis of project progress.

Product:

- Monthly Progress Reports

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 projects and improvements.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will also prepare a confidential version of the Final Report, 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 Final Report guidelines which will be provided by the CPM. The CPM shall provide written comments on the Draft Final Report within 15 working days of receipt. The Final Report must be completed at least 90 days 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

Exhibit A Scope of Work

Task 1.6 Identify and Obtain Match Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained 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 Energy Commission 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 Energy Commission 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 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 CPM 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, 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, 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. For match funds provided by a grant a copy of the executed grant shall be submitted in place of a letter of commitment.
- 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 a letter including the appropriate information to the CPM if during the course of the Agreement additional match funds are received.

Exhibit A Scope of Work

- Provide a letter to the CPM 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
- Copy(ies) of each match fund commitment letter(s) (if applicable)
- Letter(s) for new match funds (if applicable)
- Letter that match funds were reduced (if applicable)

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 Energy Commission 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.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the CPM 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 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.

Exhibit A Scope of Work

- If during the course of the Agreement additional permits become necessary, provide an updated list of permits (including the appropriate information on each permit) and an updated schedule to the CPM.
- As permits are obtained, send a copy of each approved permit to the CPM.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CPM within 5 working days. Either of these events may trigger an additional CPR.

Products:

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

Task 1.8 Obtain and Execute Subcontracts

The goal of this task is to ensure quality products and to procure subcontracts required to carry out the tasks under this Agreement consistent with the terms and conditions of this Agreement and the Recipient's own procurement policies and procedures. This task will also provide the Energy Commission an opportunity to review the subcontracts to ensure that the tasks are consistent with this Agreement, and that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Manage and coordinate subcontractor activities.
- Submit a draft of each subcontract required to conduct the work under this Agreement to the Commission Agreement Manager for review.
- Submit a final copy of the executed subcontract.
- If the Recipient decides to add new subcontractors, it shall notify the Commission Agreement Manager.

Products:

- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS

TASK 2 STUDY DISTRIBUTED GENERATION ON THE SECONDARY NETWORK

Exhibit A Scope of Work

The goal of this task is to collaborate with the Pacific Gas and Electric Company (PG&E)¹ to determine the regulatory barriers to and cost implications of upgrading distribution infrastructure along identified sections of the central corridor. The upgrades would enable increased penetration of renewable distributed generation (DG) and increased loads due to electric vehicles. These efforts will build from existing CPUC requirements that utilities such as PG&E identify the surplus capacity on their distribution systems available for connecting DG systems.

The Recipient Shall:

- Identify the regulatory barriers to implementing a community-wide project:
 - Identify applicable codes, regulations, and standards.
 - Identify known potential regulatory issues.
 - Discuss any utility concerns with California and out-of-state investor and publicly-owned utilities (such as PG&E, the San Francisco Public Utilities Commission, and NRG) that are engaged in renewable energy integration.
 - Work with the utilities specified above to create a mutually satisfactory solution to identified barriers.
- Investigate the economics of allowing DG onto the secondary network in the central corridor:
 - Determine the areas where network modifications are required in the central corridor.
 - Work with PG&E to: (1) understand the existing technical engineering concerns to increasing renewable technology; and (2) prepare economic estimations for the works required to facilitate large-scale renewable penetration.
- Prepare a *Community-Scale Electricity Regulations Report* that includes but is not limited to the following:
 - A summary of all meetings with PG&E
 - A list of regulations applicable to a community-wide project
 - Potential regulatory issues
 - A description of the work undertaken to address these concerns and the outcomes of this work
 - A review of how a community-wide project may be replicated throughout other areas of California
- Prepare a *Community-Scale Technical and Economic Impact Report* that includes but is not limited to the following:
 - Summary of all meetings with PG&E

Exhibit A Scope of Work

- Reporting and mapping of where network modifications are required in the central corridor. The reporting and mapping must be specific to San Francisco, but applicable to other California secondary networks
- Report on PG&E's technical engineering concerns about increasing renewable technology within an urban electricity distribution system

Exhibit A Scope of Work

- Cost estimates for the work required to facilitate large-scale renewable penetration in urban distribution systems that may be used as a guide/benchmark to inform other projects within California

Products:

- Draft Community-Scale Electricity Regulations Report
- Final Community-Scale Electricity Regulations Report
- Draft Community-Scale Technical and Economic Impact Report
- Final Community-Scale Technical and Economic Impact Report

TASK 3 STUDY ENABLING TECHNOLOGIES

The goal of this task is to identify an area within the central corridor where enabling technologies may be used to link several community-installed renewable generation technologies. This task will examine enabling technologies that are specific to the electricity and heating/cooling energy vectors, and that reduce the carbon intensity of the existing NRG San Francisco Energy Center. These technologies will be identified based on the results of Task 2.

The Recipient shall:

- Facilitate site visits to operational microgrids to examine successes and failures in the operation and performance of a microgrid with integrated renewable energy and storage.
- Conduct use case mappings for electricity and heat-enabling technologies that will:
 - Identify and develop requirements and bounds of the respective energy system in conjunction with all stakeholders via a series of interactive and collaborative use case workshops.
 - Engage community members and stakeholders by soliciting their input on their desire for and the needs of such a system.
 - Review two electricity enabling technology Use Cases:
 - Use Case 1:
 - This use case will investigate and report on generation, energy storage operations, and technical constraints. It will also address the following stakeholder issues:
 - The requirements and ideal locations for local generation/storage
 - Current planned generation on new property developments

Exhibit A Scope of Work

- Existing generation within the study area
- Feedback from Task 1 and the locations that are technically and commercially ideal for development
- Current and future property developments and their respective power needs
- Defining the bounds of property developments to be served by new generation assets
- Energy market participation such as frequency regulation via the use of storage assets
- The ownership and operation of new assets
- Distribution of distributed energy resources/storage to all stakeholders
- Achievement of distributed energy resources/storage for all stakeholders within the current regulatory framework
- Use Case 2:
 - This use case will investigate the enabling technology required to facilitate the development of the goals defined following Use Case 1, and will address the following issues:
 - Limitations of the existing infrastructure
 - Features of an ideal system
 - Technology options
 - Whether the community system can continue to generate energy when there is a utility outage
 - Whether the community system can successfully separate from the electrical grid in a planned and unplanned manner
 - Ownership of assets
- Review one heat enabling technology use case:
 - Use Case:
 - This use case will investigate how the existing district heating system (the NRG Energy Center) can reduce its reliance on natural gas by benchmarking current performance and by answering the following questions:
 - Is bio-gas a feasible component for integration to the NRG Energy Center?

Exhibit A Scope of Work

- Can solar thermal energy provide a meaningful contribution to the NRG Energy Center?
 - What other current or near term solutions exist to reduce the natural gas consumption of the plant?
 - Can replacement parts of maintenance improve the performance?
- Prepare an *Electricity Use Case Report* and a *Heating and Cooling Use Case Report*. Each report will include but is not limited to the following items from the respective Use Case Mappings:
 - A summary of the use-case meetings, including attendance
 - A copy of presentations from use case workshops
 - Results of the use case workshops, including:
 - The needs of the system
 - Technologies that can meet the needs of the system
 - The functional requirements of the system
 - The non-functional requirements of the system
 - A review of how the proposed technology may be replicated across California
 - A series of recommendations for the next steps to replicate the proposed technology across California.
- Participate in CPR per Task 1.2

Products:

- Draft Electricity Use Case Report
- Final Electricity Use Case Report
- Draft Heating and Cooling Use Case Report
- Final Heating and Cooling Use Case Report
- CPR Report

TASK 4 STUDY ENERGY STORAGE AND GENERATION

The goal of this task is to conceptually identify suitable generation technologies and sizes that would be required to provide energy to the central corridor. The location of this generation will be based on the results of Tasks 2 and 3.

The Recipient Shall:

- Review and document PG&E's electric and gas reliability statistics (dating back 5 to 10 years).
- Conduct energy modeling and baseline establishment of stakeholder loads.
- Refine and document desired stakeholder level of resilience (time/scale).

Exhibit A Scope of Work

- Model energy generation options to meet resilience criteria. Specifically consider:
 - rooftop-scale PV
 - Fuel Cells
 - EV storage applications including vehicle-to-grid
 - Waste to Energy (if applicable to the community members)
 - Integrated Transport Energy opportunities such as regenerative subway breaking and ground coupled heat resources
- Summarize business options for generation and storage ownerships, including individual stakeholders, third parties, and the general public.
- Refine technical/regulatory challenges and financial implications of generation and storage for executive decision making.
- Present final concepts for energy generation and resiliency and energy storage.
- Model at least three energy storage options for the smart/microgrid to meet resilience criteria, including chemical/flow batteries, compressed and liquid air, and thermal energy storage.
- Prepare a *Generation and Storage Report* that includes but is not limited to:
 - A summary of the existing PG&E outage information in the study area and the opportunities to increase energy resilience
 - Results from energy modeling of stakeholder loads
 - Results of the energy generation and energy storage modeling to include:
 - Technology assessed
 - Suitability
 - Any particular issues that resulted
 - Scale required for the project
 - Economic analysis and business case
 - A review of how the proposed technology could be replicated across California
 - A series of recommendations for the next steps to replicate the proposed technology across California.

Products:

- Draft Generation and Storage Report
- Final Generation and Storage Report

TASK 5 STUDY THE DISTRICT THERMAL ENERGY CONCEPT

The goal of this task is to explore the feasibility of enhancing and supplementing San Francisco's existing District Thermal Energy system to increase the level of district energy in a community environment within the city's Central Corridor. This task will

Exhibit A Scope of Work

involve the Recipient's use of a study titled "Community Energy District-Scale Planning in San Francisco's Transit Center District and Central Corridor", which it is developing with funding from the U.S. Environmental Protection Agency (EPA).

The Recipient Shall:

- Select an area within the San Francisco Central Corridor for detailed study and analysis. This area will be selected based on results from previous tasks and the above-mentioned EPA-funded study.
- Complete a *District Energy Feasibility Study* of the selected area that considers multiple components and generation sources of energy, with an emphasis on thermal energy. Within the selected area:
 - Identify applicable codes, regulations, and standards
 - Identify potential permits
 - Define the anticipated system loads served by the District Energy plant
 - Identify known potential points of connection/responsibility to other projects to verify that there are no gaps in scope to a complete system
 - Review three components of energy: heat, chilled water, and the link to the generation scope from Task 4
 - Size the conceptual District Energy system and calculate the energy output
 - Calculate the economic implications and benefits of the district system
 - Provide recommendations for future studies
- Prepare a *District Thermal Energy Concept Report* that includes but is not limited to the following:
 - A summary of the progress made under the Recipient's EPA-funded study and the manner in which the study has informed the Recipient's work and strategy
 - A summary of the applicable codes, regulations, and standards
 - Details of any permitting issues that were encountered
 - Definition of the anticipated system loads served by the District Energy plant
 - Identification of the potential points of connection/responsibility to other community members
 - The conceptual size of the district energy system and energy output
 - The results of the economic implications and benefits of the district system
 - A review of how the proposed technology may be replicated across California
 - A series of recommendations for the next steps to replicate the proposed technology across California.
 - Results of the district energy feasibility study

Products:

V: 5/8/13

18 of 20
Exhibit A

PIR-12-010
Department of the Environment
City and County of San Francisco

Exhibit A Scope of Work

- District Energy Feasibility Study
- Draft District Thermal Energy Concept Report
- Final District Thermal Energy Concept Report

TASK 6 DATA COLLECTION AND ANALYSIS

The goals of this task are to collect operational data, analyze the data for economic and environmental impacts, and include the data and analysis in the Final Report.

The Recipient shall:

- Develop a data collection test plan based on input from the Energy Commission project manager. The plan will include but not be limited to a discussion of the following:
 - Energy savings and estimated cost savings
 - Greenhouse gas reductions
 - Other non-energy benefits
- Provide data on potential job creation, market potential, economic development, and increased state revenue as a result of expected future expansion.
- Provide an estimate of the project's energy savings and other benefits such as potential statewide energy savings once market potential has been realized.
- Compare project performance and expectations provided in the proposal to actual project performance and accomplishments.
- Prepare a Data Analysis Report.

Products:

- Draft Data Analysis Report
- Final Data Analysis Report

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 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.

Exhibit A Scope of Work

- Conduct technology transfer activities in accordance with the Technology Transfer Plan. These activities will be reported in the Monthly Progress Reports.
- Indicate the intended use(s) and users of the project results.

Products:

- Draft Technology Transfer Plan
- Final Technology Transfer Plan



Award Number: PIR-12-010

Date: 2 / 25 / 2013

Note: The Energy Commission Project Managers Manual includes detailed instructions on how to complete this section, with examples of grants that are “Projects” and are not “Projects”. When the Project Manager is completing this section, if questions arise as to the appropriate answers to the questions below, please consult with the Energy Commission attorney assigned to review grants or loans for your division.

1. Is grant/loan considered a “Project” under CEQA? Yes *(skip to question #2)* No *(continue with question #1)*

Please complete the following: *[Public Resources Code (PRC) 21065 and 14 California Code of Regulations (CCR) 15378]:*

Explain why the grant/loan is **not** considered a “Project”? The grant/loan will not cause a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because grant/loan involves:

This grant involves only paper studies and planning activities. No physical changes to the environment will occur.

2. If grant/loan is considered a “Project” under CEQA: *(choose either IS or IS NOT)*

Grant/loan **IS** exempt:

Statutory Exemption: *(List PRC and/or CCR section numbers)* _____

Categorical Exemption: *(List CCR section number)* _____

Common Sense Exemption. *(14 CCR 15061(b)(3))*

Explain reason why the grant/loan is exempt under the above section:

Please attach draft Notice of Exemption (NOE). Consult with the Energy Commission attorney assigned to your division for instructions on how to complete the NOE.

Grant/loan **IS NOT** exempt. The Project Manager needs to consult with the Energy Commission attorney assigned to your division and the Siting Office regarding a possible initial study.