

**CONTRACT REQUEST FORM (CRF)**

CEC-94 (Revised 01/13)

CALIFORNIA ENERGY COMMISSION



A) New Agreement - - - (To be completed by CGL Office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Simone Brant	43	916-327-2201

C) Contractor's Legal Name	Federal ID Number
The Regents of the University of California on behalf of the Berkeley campus	94-6002123

D) Title of Project
Study of Linked Water and Natural Gas Demand

E) Term and Amount	Start Date	End Date	Amount
	1/15/2014	1/15/2016	\$ 250,000

**F) Business Meeting Information**

Operational agreement (see CAM Manual for list) to be approved by Executive Director

ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	11/13/2013	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Simone Brant	Time Needed:	5 minutes

Please select one list serve. Select

**Agenda Item Subject and Description**

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, BERKELEY. Possible approval of Contract 500-13-002 for \$250,000 with the Regents of the University of California on behalf of the Berkeley Campus to quantify the linkages between residential demand for water and natural gas and the sensitivity of demand to price, income, weather, and conservation technologies to inform demand forecasting and explore opportunities for joint water and natural gas conservaton. Contact: Simone Brant. (5 minutes)

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

1. Is Agreement considered a "Project" under CEQA?

Yes (skip to question 2)  No (complete the following (PRC 21065 and 14 CCR 15378)):

Explain why Agreement is not considered a "Project":  
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because it only involves analysis of existing data

2. If Agreement is considered a "Project" under CEQA:

a) Agreement **IS** exempt. (Attach draft NOE)

Statutory Exemption. List PRC and/or CCR section number: \_\_\_\_\_

Categorical Exemption. List CCR section number: \_\_\_\_\_

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

Explain reason why Agreement is exempt under the above section:

b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)

Check all that apply

Initial Study  Environmental Impact Report

Negative Declaration  Statement of Overriding Considerations

Mitigated Negative Declaration

**H) List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)**

Legal Company Name:	Budget	SB	MB	DVBE
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**I) List all key partners: (attach additional sheets as necessary)**

Legal Company Name:
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**J) Budget Information**

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	12-13	501.001G	\$250,000
R&D Program Area: EGRO: EA		TOTAL:	\$
Explanation for "Other" selection			
Reimbursement Contract #:	Federal Agreement #:		



K) Contractor's Administrator/ Officer				Contractor's Project Manager			
Name:	Jyl Baldwin			Name:	Maximillian Auffhammer		
Address:	2195 HEARST AVE			Address:	2195 HEARST AVE		
City, State, Zip:	BERKELEY, CA 94720-1083			City, State, Zip:	BERKELEY, CA 94720-1083		
Phone:	510-642-8114 /	Fax:	- -	Phone:	510-643-5472 /	Fax:	- -
E-Mail:	Jbaldwin@uclink.berkeley.edu			E-Mail:	auffhammer@berkeley.edu		

**L) Selection Process Used** (For amendments, address amendment exemption or NCB, do not identify solicitation type of original agreement.)

Solicitation Select Type Solicitation #: \_\_\_\_\_ # of Bids: \_\_\_\_\_ Low Bid?  No  Yes

Non Competitive Bid (Attach CEC 96)

Exempt Interagency

**M) Contractor Entity Type**

Private Company (including non-profits)

CA State Agency (including UC and CSU)

Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)

**N) Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?**  No  Yes

If yes, check appropriate box:  SB  MB  DVBE

**O) Civil Service Considerations**

Not Applicable (Agreement is with a CA State Entity or a membership/co-sponsorship)

Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)

The Services Contracted:

- are not available within civil service
- cannot be performed satisfactorily by civil service employees
- are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.

The Services are of such an:

- urgent
- temporary, or
- occasional nature

that the delay to implement under civil service would frustrate their very purpose.

**Justification:**  
The contract is an interagency agreement which is exempt from civil service considerations.

**P) Payment Method**

A. Reimbursement in arrears based on:

- Itemized Monthly
- Itemized Quarterly
- Flat Rate
- One-time

B. Advanced Payment

C. Other, explain:

**Q) Retention**

1. Is Agreement subject to retention?  No  Yes

If Yes, Will retention be released prior to Agreement termination?  No  Yes

**R) Justification of Rates**

The rates identified in this contract are consistent with the standard negotiated rates between the University of California and the Energy Commission.

**S) Disabled Veteran Business Enterprise Program (DVBE)**

1.  Exempt (Interagency/Other Government Entity)

2.  Meets DVBE Requirements DVBE Amount:\$ \_\_\_\_\_ DVBE %: \_\_\_\_\_

- Contractor is Certified DVBE
- Contractor is Subcontracting with a DVBE: \_\_\_\_\_

3.  Contractor selected through CMAS or MSA with no DVBE participation.

**CONTRACT REQUEST FORM (CRF)**



4.  Requesting DVBE Exemption (attach CEC 95)

T) Miscellaneous Contract Information		
1. Will there be Work Authorizations?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
2. Is the Contractor providing confidential information?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
3. Is the Contractor going to purchase equipment?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
4. Check frequency of progress reports <input type="checkbox"/> Monthly <input checked="" type="checkbox"/> Quarterly <input type="checkbox"/> _____		
5. Will a final report be required?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
6. Is the contract, with amendments, longer than a year? If yes, why?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.		

u) The following items should be attached to this CRF (as applicable)		
1. Exhibit A, Scope of Work	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
2. Exhibit B, Budget Detail	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
3. CEC 96, NCB Request	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
4. CEC 30, Survey of Prior Work	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEC 95, DVBE Exemption Request	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
6. CEQA Documentation	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
7. Resumes	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
8. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> Attached

\_\_\_\_\_  
 Agreement 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		Data Collection on Natural Gas Consumption
3		Trend Analysis of Residential Natural Gas, Water, and Electricity Consumption
4		Econometric Analysis of Water Demand Hardening due to Efficiency Investments
5		Estimating the Energy Penalty of Preemptive Federal Energy Efficiency Regulation
6		Estimating Baseline Water Irrigation Water Consumption and Embedded Energy

**KEY NAME LIST**

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Maximilian Auffhammer		
2			
3			
4			
5			
6			

**GLOSSARY**

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

Acronym	Definition
CPR	Critical Project Review
CPUC	California Public Utilities Commission
Energy Commission	California Energy Commission
IOU	Investor-owned utility
NG	Natural Gas
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
UCEI	The University of California Energy Institute

## **Problem Statement**

California's population will grow by 3.6 million over the coming decade and another 3.7 million over the following decade.<sup>1</sup> These projections are consistent with the growth experienced over the past decade. Population growth goes hand in hand with higher resource demand. Natural gas consumption in California has been growing at 1% per year from 1985-2005. Natural gas currently supplies approximately 30% of California's total energy consumption, and the residential sector uses 22 percent of total natural gas. Urban water use in California has grown more quickly (1.6% per year). In 2005, urban water use was estimated at 9.05 million acre feet per year.<sup>2</sup> Roughly two thirds of urban water use is accounted for by residences for both indoor and outdoor use. A set of three recent California Public Utilities Commission (CPUC) - sponsored studies shows that the amount of embedded energy in water is significant.

Department of Finance population projections suggest that population growth will not be uniform across California. This has significant implications for projected resource use. Residents in the hot Central Valley have a different consumption profile for natural gas, water, and electricity from residents of coastal Southern and Northern California. The California Energy Commission (Energy Commission) demand forecast therefore breaks California into 16 distinct zones. This project will fill the gaps in current knowledge that were identified during planning meeting with Energy Commission staff and management in Sacramento in April 2013.

One of the key tasks for planners in a world of resource scarcity is to identify precisely estimated sensitivities of natural gas and water consumption by sector to their respective drivers. Water and natural gas demand are responsive to prices, income, weather, and the degree to which efficient technologies are adopted. The exact magnitudes of these responses are extremely difficult to estimate, yet of key importance for utility planners and regulators (e.g., CPUC and Energy Commission). For example, if demand for natural gas is not very responsive to price, a desired reduction in usage would require a very high price, e.g. carbon tax. Many demand forecasting models make assumptions about the values of these parameters, without much empirical guidance.

In this study the Contractor will inform these models via econometrically estimated demand parameters for water, and will further understanding of how demand evolves as technologies adopted voluntarily and through policy become more efficient. The Contractor will also examine important linkages between natural gas and water use in residences.

## **Goals of the Agreement**

The goals of this Agreement are to: (1) compile a state-of-the-art, micro-level data set on natural gas and water consumption for as many households/utilities as possible; (2) provide estimates of observed trends in that data on natural gas, water, and electricity consumption at or at a finer level than the 16 zones in the Energy Commission Demand Forecasting Model; (3) estimate the sensitivity of residential water demand to price, income, weather,

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<sup>1</sup> California Department of Finance, 2013. Population Projections, 2010-2060.  
<http://www.dof.ca.gov/research/demographic/reports/projections/view.php>

<sup>2</sup> Christian-Smith, J, M Heberger and L Allen. 2012. Urban Water Demand to 2100: Incorporating Climate Change. Pacific Institute.

and conservation technologies; (4) quantify the energy penalty of federal preemption of efficiency standards; and (5) provide estimates of baseline irrigation demand by water district.

The project findings will inform forecasts of natural gas and residential water demand, identify opportunities for savings statewide, and assist in Energy Commission and CPUC rulemaking efforts.

### **Objectives of the Agreement**

The objectives of this Agreement are to:

- Construct a natural gas, micro-level dataset to be housed at the UC Energy Institute.
- Provide a set of estimated trends on natural gas, electricity, and water at the level of the 16 zones or below using the collected data.
- Provide estimates of the weather, price, income, and conservation technology sensitivity of residential water demand using the collected data.
- Provide estimates of the energy cost of federal preemption for energy efficiency standards.
- Provide water district-level estimates of baseline irrigation water consumption and embedded energy using CPUC energy estimates.

## **TASK 1.0 ADMINISTRATION**

### **MEETINGS**

#### **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 Contractor shall:**

- Attend a “kick-off” meeting with the Commission Contract Manager, the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the Commission Contract 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 Contract 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:

- Terms and conditions of the Agreement
- CPRs (Task 1.2)
- Match fund documentation (Task 1.7)
- Permit documentation (Task 1.8)

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

- The Commission Contract Manager’s expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- Progress Reports (Task 1.4)
- Technical Deliverables (Task 1.5)
- Final Report (Task 1.6)
- Establish the PAC (Task 1.10)
- PAC Meetings (Task 1.11)

The Commission Contract Manager shall designate the date and location of this meeting.

#### **Contractor Deliverables:**

- An Updated Schedule of Deliverables
- An Updated Gantt Chart (if included)
- An Updated List of Match Funds
- An Updated List of Permits
- Schedule for Recruiting PAC Members

## **Commission Contract Manager Deliverables:**

- Final Report Instructions

### **Task 1.2 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 if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Contract Manager and as shown in the Technical Task List above and in the Schedule of Deliverables. However, the Commission Contract Manager may schedule additional CPRs as necessary, and, if necessary, the budget will be reallocated to cover the additional costs borne by the Contractor, but the overall contract amount will not increase.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

#### **The Commission Contract Manager shall:**

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Contractor 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 to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks.
- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

#### **The Contractor 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 deliverables identified in this Scope of Work. Submit these documents to the Commission Contract 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.

**Contractor Deliverables:**

- CPR Report(s)
- CPR deliverables identified in the Scope of Work

**Commission Contract Manager Deliverables:**

- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

**Task 1.3 Final Meeting**

The goal of this task is to closeout this Agreement.

**The Contractor shall:**

- Meet with the Energy Commission 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 Contractor, the Commission Contracts Officer, and the Commission Contract 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 Contract Manager.

The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Commission Contract Manager and the Contracts Officer about the following Agreement closeout items:

- What to do with any state-owned equipment (Options)
  - Need to file UCC.1 form re: Energy Commission's interest in patented technology
  - Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
  - Need to document Contractor's disclosure of "subject inventions" developed under the Agreement
  - "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
  - Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

**Deliverables:**

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

**REPORTING**

**See Exhibit D, Reports/Deliverables/Records.**

**Task 1.4 Quarterly 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.

**The Contractor shall:**

- Prepare progress reports, which summarize all Agreement activities conducted by the Contractor 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 Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

**Deliverables:**

- Quarterly Progress Reports

**Task 1.5 Test Plans, Technical Reports and Interim Deliverables**

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site: <http://www.energy.ca.gov/contracts/pier/contractors/index.html>.

**The Contractor shall:**

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

## **Task 1.6 Final Report**

The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement.

When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/index.html>

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

### **Task 1.6.1 Final Report Outline**

#### **The Contractor shall:**

- Prepare a draft outline of the Final Report.
- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

#### **Deliverables:**

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

### **Task 1.6.2 Final Report**

#### **The Contractor shall:**

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.

Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.

- Submit one bound copy of the Final Report with the final invoice.

**Deliverables:**

- Draft Final Report
- Final Report

**MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT**

**Task 1.7 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. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

**The Contractor shall:**

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
  1. 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.
  2. 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 Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.

- 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 significantly 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 Commission Contract Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

**Deliverables:**

- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

**Task 1.8 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 reimbursable under this Agreement. Permits must be identified in writing before the Contractor can incur any costs related to the use of the permit(s) for which the Contractor will request reimbursement.

**The Contractor shall:**

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
  1. If there are no permits required at the start of this Agreement, then state such in the letter.
  2. 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

- Schedule the Contractor will follow in applying for and obtaining these permits.
- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. 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, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

**Deliverables:**

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

**Task 1.9 Electronic File Format**

The goal of this task is to unify the formats of electronic data and documents provided to the Energy Commission as contract deliverables. Another goal is to establish the computer platforms, operating systems and software that will be required to review and approve all software deliverables.

**The Contractor shall:**

- Deliver documents to the Commission Contract Manager in the following formats:
  - Data sets shall be in Microsoft (MS) Access or MS Excel file format.
  - PC-based text documents shall be in MS Word file format.
  - Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
  - Project management documents shall be in MS Project file format.
- Request exemptions to the electronic file format in writing at least 90 days before the deliverable is submitted.

**Deliverables:**

- A letter requesting exemption from the Electronic File Format (if applicable)

## **PAC**

### **Task 1.10 Establish the PAC**

The goal of this task is to create an advisory committee for this Agreement.

The PAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The exact composition of the PAC may change as the need warrants. PAC members serve at the discretion of the Commission Contract Manager.

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

- Researchers knowledgeable about the project subject matter
- Members of the trades who will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives)
- Public Interest Market Transformation Implementers
- Product Developers relevant to project subject matter
- U.S. Department of Energy Research Manager
- Public Interest Environmental Groups
- Utility Representatives
- Members of the relevant technical society committees

The purpose of the PAC is to:

- Provide guidance in research direction. The guidance may include scope of research; research methodologies; timing; coordination with other research. The guidance may be based on:
  - technical area expertise
  - knowledge of market applications
  - linkages between the agreement work and other past, present or future research (both public and private sectors) they are aware of in a particular area.
- Review deliverables. Provide specific suggestions and recommendations for needed adjustments, refinements, or enhancement of the deliverables.
- Evaluate tangible benefits to California of this research and provide recommendations, as needed, to enhance tangible benefits.
- Provide recommendations regarding information dissemination, market pathways or commercialization strategies relevant to the research products.

### **The Contractor 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 Contract 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 1.11.
- Prepare the final list of PAC members.

**Deliverables:**

- Draft List of PAC Members
- Final List of PAC Members

**Task 1.11 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 Contractor 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 Contract 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 Contract Manager.
- Prepare PAC meeting agenda(s) with back-up materials for agenda items.
- Prepare PAC meeting summaries, including recommended resolution of major PAC issues.

**Deliverables:**

- Draft PAC Meeting Schedule
- Final PAC Meeting Schedule
- PAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- Written PAC meeting summaries, including recommended resolution of major PAC issues

## **TECHNICAL TASKS**

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5. Deliverables not requiring a draft version are indicated by marking “(no draft)” after the deliverable name.

### **Task 2 DATA COLLECTION**

The goal of this task is to compile a dataset on residential natural gas consumption from natural gas utilities. The University of California Energy Institute (UCEI) has worked closely with California’s investor-owned utilities (IOUs) to establish a billing data center for electricity consumption, which now houses a decade’s worth of bills for the three IOUs. The Contractor will compile a similar dataset for natural gas utilities willing to share data.

#### **The Contractor shall:**

- Set up meetings with California’s eight natural gas utilities and discuss the possibility of a confidential data center on natural gas consumption using the existing model of the electricity data center at the UCEI.
- Discuss non-disclosure agreements with the natural gas utilities.
- Request transfer of data to the UCEI data center.
- Request aggregate data on daily gas deliveries at the five-digit ZIP code level.
- Combine data into a format for analysis.
- Clean data to ensure that dataset is accurate and in useable form.
- Prepare a technical memorandum entitled “Data Collection from Utilities” that includes but is not limited to details on which type of data has been provided by each utility.
- Prepare a CD that contains collected data at a level of detail allowed by agreements with individual utilities.

#### **Deliverables:**

- “Data Collection from Utilities” technical memorandum (no draft)
- CD containing utility data

### **Task 3 TREND ANALYSIS OF RESIDENTIAL GAS, WATER, AND ELECTRICITY CONSUMPTION**

The goal of this task is to estimate trends in natural gas, electricity, and water consumption at the most disaggregated spatial level for each energy source for the set of 16 Energy Commission zones covered by the data, and at finer levels of aggregation where possible. The analysis will provide estimates of key parameters for the residential demand for water. Specifically, the Contractor will improve understanding of how demand varies over time and in response to changes in its drivers, both jointly and separately. The ultimate use of these coefficients will help identify the most cost effective opportunities for reducing water consumption. As discussed below, the Contractor will exploit a unique dataset on water consumption covering most of California to estimate:

- The elasticity of water consumption to various measures of price
- The elasticity of water demand with respect to weather
- The elasticity of water demand with respect to housing characteristics

**The Contractor shall:**

- Use data collected in Task 2 as well as previously collected data on water consumption for single and multi-family residences as well as the electricity consumption data to econometrically estimate trends in consumption over the time period available.
- Work with the Energy Commission Demand Forecasting Office to provide trends at a spatial level of aggregation to match that of the Energy Commission model.
- Conduct correlation analysis of trends across resource type to determine in the areas in which natural gas, electricity, and water trend as complements as substitutes.
- Provide summary statistics to verify aggregate consumption data used by the Demand Forecasting Model.
- Prepare a technical memorandum entitled “Trends in Natural Gas, Electricity, and Water Consumption for Residential Households in the 16 Energy Commission Zones” that discusses estimation methodology and results. The memo must be approximately 10 pages including figures, tables, and references.
- Prepare a Spreadsheet of Estimated Trends and Summary of Consumption.

**Deliverables:**

- “Trends in Natural Gas, Electricity, and Water Consumption for Residential Households in the 16 Energy Commission Zones” technical memorandum (no draft)
- Spreadsheet of Estimated Trends and Summary of Consumption

**Task 4 ECONOMETRIC ANALYSIS OF WATER DEMAND HARDENING DUE TO EFFICIENCY INVESTMENTS**

The goal of this task is to estimate a water demand function based on an extensive panel dataset at the water district level for single and multi-family residences. The Contractor will provide estimates of the elasticity of water consumption to various measures of price, weather, and housing characteristics. Specifically, the Contractor will test whether there is empirical evidence of water demand hardening (whereby demand becomes less price elastic as conservation technologies are more widely adopted).

**The Contractor shall:**

- Econometrically estimate the sensitivity of single and multi-family residence demand to income, price, and weather using consumption data available at the water district level, and in some cases at the retailer level.
- Test for evidence of demand hardening, whereby demand becomes less price-responsive as the penetration of conservation technologies increases.
- Prepare a technical memorandum entitled “Analysis of California Residential Water Demand” that presents results of water demand hardening analysis. The memo must be approximately 10 pages including figures, tables, and references.

**Deliverables:**

- “Analysis of California Residential Water Demand” technical memorandum (no draft)

**Task 5 ESTIMATING THE ENERGY PENALTY OF PREEMPTIVE FEDERAL ENERGY EFFICIENCY REGULATION**

The goal of this task is to provide a better empirical understanding of the energy penalty of federal preemption of energy efficiency standard setting. The Contractor will work with Energy Commission staff to collect a database of California energy efficiency rules affecting natural gas and electricity, and to compare these to the Federal Rules. The Contractor will then model the “lost” savings due to preemption using adoption rates assumed in standard Energy Commission modeling efforts.

**The Contractor shall:**

- Work with Energy Commission staff to establish a list of historical and planned rules that have been preempted by federal standards.
- Work with Energy Commission staff to determine the types of appliances affected and modeled adoption trajectories.
- Simulate lost energy savings by rule type and year.
- Prepare a technical memorandum entitled “The Energy Penalty of Preemptive Federal Energy Efficiency Regulation” that provides estimates of energy losses due to federal preemption and lists policies, modeling assumptions, and results. The memo must be approximately 10 pages including figures, tables, and references.

**Deliverables:**

- “The Energy Penalty of Preemptive Federal Energy Efficiency Regulation” technical memorandum (no draft)

**Task 6 ESTIMATING BASELINE IRRIGATION CONSUMPTION AND EMBEDDED ENERGY**

The goal of this task is to provide a better empirical understanding of the baseline water consumption for residential irrigation in California. The Contractor will use an econometric model on the data employed in Task 4 to provide estimates of summer irrigation consumption by single and multi-family residences from district/retailer level consumption data already collected. The Contractor will compare the estimates to the small sample modeled estimates from the three recent CPUC studies, and will use their models to provide estimates of embedded energy in irrigation water by water district.

**The Contractor shall:**

- Construct an econometric model of seasonal water consumption.
- Provide estimates of irrigation water consumption per household by water district (or retailer wherever possible).
- Use CPUC-embedded energy estimates to provide estimates at the water district (or retailer wherever possible) level of embedded energy consumption of irrigation.

- Benchmark results to small sample simulation results from the three CPUC studies.
- Prepare a technical memorandum entitled “Irrigation Consumption and Embedded Energy” that provides estimates of irrigation water consumption and embedded energy by water district, and lists policies, modeling assumptions, and results. The memo must be no longer than 10 pages including figures, tables, and references.

**Deliverables:**

- “Irrigation Consumption and Embedded Energy” technical memorandum (no draft).