

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: UNIVERSITY OF CALIFORNIA, RIVERSIDE

**RESOLVED**, that the State Energy Resources Conservation and Development Commission (Energy Commission) approves Contract 500-11-015 for \$1.2 million with the Regents of the University of California on behalf of the Riverside campus to ensure compatibility of new renewable natural gas and other alternative fuels with existing transportation fuels infrastructure. (PIER natural gas funding.)

**FURTHER BE IT RESOLVED**, that this document authorizes the Executive Director to execute the same on behalf of the Energy Commission.

**CERTIFICATION**

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on February 8, 2012.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Harriet Kallemeyn,  
Secretariat

**CONTRACT REQUESTS FORM (CRF)**

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION


 New Contract 500-11-015     Amendment to Existing Contract: \_\_\_\_\_ Amendment Number: \_\_\_\_\_

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	David Effross	43	916-327-1314	6/26/2008

Contractor's Legal Name	Federal ID Number
The Regents of the University of California on behalf of the Riverside campus	94-3067788

Title of Project
Alternative Fuels Natural Gas Infrastructure Compatibility

Term	Start Date	End Date	Amount
New/Original Contract	6/1/2012	6/30/2014	\$ 1,200,000

Line up the Amendment information as best as possible within the following table.

Amendment #	End Date (mm/dd/yy)	Amount

### Business Meeting Information

Proposed Business Meeting Date	4/11/2012	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	David Effross	Time Needed:	5 minutes

### Agenda Item Subject and Description

Possible approval of Contract 500-11-015 in the amount of \$1,200,000 with the Regents of the University of California on behalf of the Riverside campus to ensure the compatibility of new renewable natural gas and other alternative fuels with existing transportation fuel infrastructure. (PIER natural gas funding.) Contact: Dave Effross. 5 minutes.

**Business Meeting approval is not required for the following types of contracts:** *Executive Director's signature is required in all cases.*

- Contracts less than \$10k (*Policy Committee's signature is also required*)
- Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than \$100k.
- Contracts less than \$25k for Expert Witness in Energy Facility licensing cases and amendments.

### Purpose of Contract or Purpose of Amendment, if applicable

This contract will accelerate research, development and demonstration (RD&D) of advanced natural gas and other renewable fuel technologies to ensure the compatibility of existing transportation fuels infrastructure (e.g. pipelines, storage, and distribution facilities) with new alternative fuels as they become commercially available.

### California Environmental Quality Act (CEQA) Compliance

- Is Contract considered a "Project" under CEQA?
  - Yes: skip to question 2                       No: complete the following (PRC 21065 and 14 CCR 15378):
  - Explain why contract is not considered a "Project":
- If contract is considered a "Project" under CEQA:
  - a) Contract **IS** exempt. (Draft NOE required)
    - 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 contract is exempt under the above section:
 

The contract does not have the potential to cause a significant environmental impact because it involves data analysis and fuel testing in a laboratory setting.
  - b) Contract **IS NOT** exempt. The Contract Manager needs to consult with the Energy Commission attorney assigned to their division and the Siting Office regarding a possible Initial Study.

**CONTRACT REQUESTS FORM (CRF)**



Budgets Information								
Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	\$	11-12	\$1,200,000	Yes	NG Subaccount, PIERDD	10-11	501.001E	\$1,200,000
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$1,200,000		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
<b>TOTAL:</b>	<b>\$1,200,000</b>	<b>TOTAL:</b>	<b>\$1,200,000</b>				<b>TOTAL:</b>	<b>\$1,200,000</b>
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Ursula Prins	Name:	Joseph Norbeck
Address:	200 University Office Building University of California	Address:	Ce-Cert/Ur 1084 Columbia Ave.
City, State, Zip:	Riverside, CA 92521-0001	City, State, Zip:	Riverside, CA 92887
Phone/ Fax:	951 827-4808 / 951 827-4483	Phone/ Fax:	951-781-5778 / 951-781-5790
E-Mail:	ursulap@ucr.edu	E-Mail:	joe.norbeck@ucr.edu

**Contractor Is**

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)

**Selection Process Used**

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

Non Competitive Bid (Attach CEC 96)

Exempt Interagency

**Civil Service Considerations**

Not Applicable (Contract 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:**

**CONTRACT REQUESTS FORM (CRF)**



**Payment Method**

A. Reimbursement in arrears based on:

Itemized Monthly       Itemized Quarterly       Flat Rate       One-time

B. Advanced Payment

C. Other, explain: \_\_\_\_\_

**Retention**

1. Is contract subject to retention?  No       Yes

If Yes, Do you plan to release retention prior to contract termination?  No       Yes

**Justification of Rates**

The overhead rates charged in this contract are the standard negotiated rates between the Energy Commission and the University of California. All other rates are standard published rates for the UC.

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

1.  Not Applicable

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

Contractor is Certified DVBE

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

3.  Requesting DVBE Exemption (attach CEC 95) \_\_\_\_\_

**Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?**

No       Yes

If yes, check appropriate box:  SB       MB       DVBE

**Is Contractor subcontracting any services?**

No       Yes

If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE: \_\_\_\_\_

**Miscellaneous Contract Information**

1. Will there be Work Authorizations?  No       Yes

2. Is the Contractor providing confidential information?  No       Yes

3. Is the contractor going to purchase equipment?  No       Yes

4. Check frequency of progress reports

Monthly       Quarterly       \_\_\_\_\_

5. Will a final report be required?  No       Yes

6. Is the contract, with amendments, longer than a year? If yes, why?  No       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.

# CONTRACT REQUESTS FORM (CRF)



The following items should be attached to this CRF			
1. Scope of Work, Attach as Exhibit A.	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
2. Budget Detail, Attach as Exhibit B.	<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. Draft CEQA Notice of Exemption (NOE)	<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	
9. CEC 106, IT Component Reporting Form		<input checked="" type="checkbox"/> Attached	

\_\_\_\_\_  
 Contract Manager                      Date                      Office Manager                      Date                      Deputy Director                      Date

The following signatures are only required when contract approval is delegated to the Executive Office and not approved at a Business Meeting. See Business Meeting Information Section.

\_\_\_\_\_  
 Presiding Policy Committee                      Date                      Associate Policy Committee                      Date                      Executive Director                      Date

**Exhibit A**  
**SCOPE OF WORK**

**TECHNICAL TASK LIST**

<b>Task #</b>	<b>CPR</b>	<b>Task Name</b>
1	N/A	Administration
2		Literature Review of Infrastructure Studies of Fungible Fuels and Associated Technologies
3	X	Test Plan Development
4		Procurement of Fuels and Materials for Testing, Design, and Construction of Exposure Chamber
5		Infrastructure and Materials Compatibility Testing
6		Data Analysis and Reporting

**KEY NAME LIST**

<b>Task #</b>	<b>Key Personnel</b>	<b>Key Subcontractor(s)</b>	<b>Key Partner(s)</b>
1-6	Joseph Norbeck (UC Riverside)		
	Thomas Durbin (UC Riverside)		
	Chan Seung Park (UC Riverside)		
	Georgios Karavalakis (UC Riverside)		

## GLOSSARY

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

Acronym	Definition
CCM	Commission Contract Manager
Energy Commission	California Energy Commission
CO	Carbon Monoxide
CPR	Critical Project Review
DMA	Dynamic Mechanical Analysis
FP	Flash Pyrolysis
FT	Fischer-Tropsch
IH2	Integrated Hydropyrolysis and Hydroconversion
MTBE	Methyl-Tertiary Butyl Peroxide
TAC	Technical Advisory Committee
PIER	Public Interest Energy Research
PM	Particulate Matter
RD&D	Research Development and Demonstration
RTP	Rapid Thermal Processing
RVP	Reid Vapor Pressure
SNG	Synthetic Natural Gas
THC	Total Hydrocarbon
UCC.1	Uniform Commercial Code (Financing Statement)

### Problem Statement

California and the rest of the nation are dependent upon an extensive and pervasive network of transportation, storage, and distribution systems that evolved over many decades around reliability criteria associated with petroleum-based fuels. These pipelines, tank farms, and other infrastructure constitute legacy systems that cannot and will not reasonably, quickly, or easily be replaced or superseded. Moreover, the nation is transitioning to greater use of alternative fuels that may come from many different sources through diverse pathways and technologies, in disparate formulations. The nation's infrastructure must be able to accommodate as many alternative fuels as possible, to allow the greatest flexibility in adoption and utilization of petroleum alternatives.

The new generation of alternative fuels will likely be deployed initially as blends with conventional fuels that are already blended with alcohol. These new fuels could blend seamlessly with current ones, or the new blends could present unanticipated synergistic effects. A potential issue is contaminants that may be found in low concentrations in new fuels.

This agreement will accelerate research, development and demonstration (RD&D) of advanced renewable fuels technologies to ensure the compatibility of existing petroleum transportation fuels infrastructure with nonpetroleum alternative fuels.

Elements of this agreement include:

1. Chemical analyses of current advanced alternative (“drop in”) fuels with relationship to infrastructure materials compatibilities (e.g., trace elements, pH, and Reid vapor pressure (RVP));
2. Field evaluations of legacy systems and associated materials;
3. Exposure of candidate materials to a range of fungible alternative transportation fuels followed by analysis, including: assessment of appearance/discoloration and weight change, which are indicators of corrosion for metals; swell, volume and mass change, and hardness/swelling for elastomers, which are indicators of degradation; and other surface analyses;
4. Evaluation of the public health effects of infrastructure failure (e.g., problems resulting from Methyl-Tertiary Butyl Peroxide (MTBE) leaks); and
5. Roadmapping of compatibility-ensuring protocols to be applied to future fuels, defining forward-looking standards of viability.

### **Goals of the Agreement**

The goal of this Agreement is to improve and advance infrastructure and fuels technologies that demonstrate the potential to reliably supply alternative transportation fuels in and for California. This study will be conducted under the California Energy Commission’s Public Interest Energy Research (PIER) Transportation Program. This program is designed to accelerate research, development and demonstration (RD&D) of advanced technologies and to ensure the compatibility of existing petroleum transportation fuels infrastructure with nonpetroleum alternative fuels. Specifically, this study will examine materials compatibility issues in California’s fuels-providing system with respect to the new classes of drop in (fungible) fuels currently under development. These fuels include renewable diesels, gasolines, and jet fuels derived through various and diverse biochemical and thermochemical processes.

Although the new generation of fuels may be fungible in automotive systems, the focus of this program is the safe and effective transportation, distribution, and storage of these fuels. American Society of Testing and Materials standards, for example, ensure these fuels’ proper interaction with existing engines, but do not directly address these subtle potential infrastructure issues.

### **Objectives of the Agreement**

The objectives of this Agreement are to:

- Advance the commercial availability of renewable transportation fuels;
- Expand the state’s portfolio of fossil-free transportation fuel options;
- Ensure end use access to new fuel sources with lower net greenhouse gas emissions, and with potential to help stabilize atmospheric carbon dioxide concentrations;
- Enhance the supply and affordability of future transportation fuel choices for California consumers;
- Reduce California’s dependence upon imported motor vehicle fuels and enhance California’s energy security; and

- Facilitate new in-state fuel production options along with their associated economic development and employment opportunities.

## **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 TAC (Task 1.10)
- TAC 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 List of Match Funds
- An Updated List of Permits

- Schedule for Recruiting TAC 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)

## **TAC**

### **Task 1.10 Establish the TAC**

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

The TAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The Contractor's Project Manager and the Commission Contract Manager shall act as co-chairs of the TAC. The exact composition of the TAC may change as the need warrants. TAC members serve at the discretion of the Commission Contract Manager.

The TAC 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 TAC 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 TAC 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 TAC meeting will be developed.
- Recruit TAC 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 TAC members.
- Submit letters of acceptance or other comparable documentation of commitment for each TAC member.

**Deliverables:**

- Draft List of TAC Members
- Final List of TAC Members
- Letters of acceptance, or other comparable documentation of commitment for each TAC Member

**Task 1.11 Conduct TAC Meetings**

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

**The Contractor shall:**

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

**Deliverables:**

- Draft TAC Meeting Schedule
- Final TAC Meeting Schedule
- TAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- Written TAC meeting summaries, including recommended resolution of major TAC 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 Literature Review of Infrastructure Studies of Fungible Fuels and Associated Technologies**

The goal of this task is to review publicly available information including literature and other sources to assess the state of research in the area of infrastructure studies related to fungible fuels. The review will focus on publicly available, non-propriety information in both the peer-reviewed literature and non-peer reviewed (“grey”) literature. This will include material compatibility studies, new fungible alternative transportation fuels, critical materials within the infrastructure, and other outstanding issues and information that can be used to develop a comprehensive test program.

**The Contractor shall:**

- Review available literature and other information sources to assess the state of research in the area of material compatibility studies, new fungible alternative transportation fuels, and critical materials within the infrastructure. This will include a review of recent studies of other nonfungible fuels, such as biodiesel and ethanol, to draw from these experiences.
- Identify and contact experts in fueling infrastructure to determine what potential issues might be found with in-use application of these fungible fuels, and what materials might be the most critical to evaluate.

- Evaluate current analytical techniques and methods for characterizing and quantifying trace elements and contamination issues at low detection limits.
- Prepare a draft Literature Review Report summarizing the results of the review of the literature and on-going research, and identified fuels and materials. The report will provide links, as applicable, to additional phases of this study. The report will also identify fuels and materials that could be utilized in the testing portion of this study.
- Incorporate feedback and recommendations from the TAC into the literature review report.
- Prepare a final Literature Review Report.

**Deliverables:**

- Literature Review Report

**Task 3 Test Plan Development**

The goal of this task is to develop a comprehensive test plan with specific details of the experimental methodology, including the types of testing methodologies and the test fuels and materials that will be used.

**The Contractor shall:**

- Prepare a Test Plan for testing under Task 5. This plan shall include, but not be limited to, the following:
  - Description of the testing
  - Test objectives and technical approach
  - Test matrix showing the number of materials/fuels and replicate runs
  - Fuels and fuel blends to be evaluated
  - Description of the facilities, equipment, and instrumentation required to conduct the tests
  - Description of the exposure chamber that will be used to expose the material samples to the different fuels
  - Description of the test procedures
  - Description of the analyses to be conducted on the different material samples following exposure to the different fuels. This will include an assessment of appearance (corrosion films, discoloration, evidence of pitting, etc.), weight change, metallography, and other surface analyses
  - Description of the data analysis procedures
  - Description of quality assurance/quality control procedures
  - Contingency measures to be considered if the test objectives are not met
- Modify the Test Plan based on feedback received from the TAC.
- Participate in the Critical Project Review and prepare a CPR Report in accordance with Task 1.2.

**Deliverables:**

- Final Test Plan
- CPR Report

**Task 4 Procurement of Fuels and Materials for Testing, Design, and Construction of Exposure Chamber**

The goal of this task is to procure the fuels and materials required for testing and to design and construct an exposure chamber for testing. Fuels that could be included will include, but not be limited to:

1. Fischer-Tropsch (FT) type fuels (synthesized from syngas [a mixture of CO and H<sub>2</sub>], which is from the thermo-chemical conversion of biomass)
  - FT diesel
  - FT gasoline
  - FT jet fuel
2. Lipid-based bio-oil type fuels (made via an esterification reaction from a lipid extract)
  - Biodiesel
  - Algae based liquid fuel
3. Liquefaction type fuels (made via a direct conversion process from biomass)
  - Fuels from upgrading Flash Pyrolysis (FP) oil (FP oil: liquefaction fuel made by the fast heating of biomass)
  - Rapid Thermal Processing (RTP) fuel (FP oil made specifically from the RTP process, which was developed by Envergent, Inc.)
  - Integrated Hydrolysis & Hydroconversion (IH2) fuel (FP oil made specifically from the IH2 process, which was developed by the Gas Technology Institute)
4. Synthetic Natural Gas (SNG) from biomass
  - SNG by methanation of syngas (a direct conversion process from syngas to methane)
  - SNG by Steam Hydrogasification (a thermochemical process developed by the University of California at Riverside)

Test fuels will be characterized for standard properties as well as other property that might have important impacts on the components of the infrastructure.

**The Contractor shall:**

- Procure test fuels, as specified in the Test Plan, and in coordination with the Energy Commission Contract Manager.
- Procure test materials, as specified in the Test Plan, and in coordination with the Energy Commission Contract Manager.
- Test fuels for basic properties as well as other properties that might be of importance when considering infrastructure issues. Such properties could include acidity, metal content, conductivity, and particulate matter content of the fuels produced.
- Conduct additional analyses to provide a more detailed characterization of the fuels that would not otherwise be done as part of typical fuel analysis at a refinery for more traditional, “known” petroleum processes. This could include detailed hydrocarbon species analysis, and analyses for other potential low level contaminants that might otherwise go undetected such as trace elements from agricultural processes like phosphorous, sulfur compounds, trace oxygenated compounds, or anticorrosion or flow improver additives. Additional analyses could also be done to evaluate the consistency of the fungible fuels produced.
- Develop and construct the exposure chamber that will be used for the fuel/material exposures.
- Prepare a Summary Memorandum on the Exposure Chamber, describing how the chamber works and how it was constructed, including photographs.

**Deliverables:**

- A Summary Memorandum on the Exposure Chamber

**Task 5 Infrastructure and Materials Compatibility Testing**

The goal of this task is to evaluate infrastructure and materials compatibility over different exposure conditions with different fuels. The Contractor will determine the focus of the evaluations, which may address the following: long- term degradation of metals and elastomers; pipeline degradation over the long term; the compatibility of new fungible fuels with fossil fuels and the associated blending; additives and potential fuel interactions; and the potential effect of new fuels on RVP and evaporative emissions from pumps and the pipeline.

**The Contractor shall:**

- Expose samples in the exposure chamber for different time intervals that could range anywhere from approximately one to four months. Following exposure, samples will be subjected to a number of tests.
- Test metal samples for mass loss, surface analysis, and visual appearance (corrosion films, discoloration, evidence of pitting, etc.). These tests will provide information on corrosion rates.
- Test elastomers for weight loss, volume swell, hardness change. Conduct Dynamic Mechanical Analyses (DMA) to measure the stress and strain responses to a sinusoidal change in a factor such as temperature. These tests will provide information on durability, permeability, leakage, and press fit sealability.

- Test plastics for weight loss, volume swell, and DMA and hardness. These tests will provide information on durability, permeability, leakage, and press fit sealability.
- Potentially evaluate the impacts of new fuels on RVP, which is a volatility measure for gasoline fuels based on the absolute vapor pressure of the fuel at 100°F, and evaporative emissions from pumps and the pipeline.
- Conduct tests to evaluate the potential for biocontamination of fuels during storage or transport.
- Prepare a Summary of Test Results (to be submitted with the Quarterly Progress Reports).

**Deliverables:**

- Summary of Test Results (no draft)

**Task 6 Data Analysis and Reporting**

The goals of this task are to conduct a comprehensive analysis of the emissions and performance data, and to prepare a Final Report summarizing the results and analysis.

**The Contractor shall:**

- Conduct a comprehensive data analysis of the Task 5 test results to determine trends in the data and corresponding relationships. This analysis will include, but not be limited to, the following:
  - Correlations between material deterioration as a function of test fuel or exposure time
  - An evaluation of the public health effects of infrastructure failure (e.g., problems resulting from MTBE leaks)
  - An examination of different issues that could impact the existing petroleum infrastructure
  - An evaluation of potential roadmapping of compatibility-ensuring protocols to be applied to future fuels, defining forward-looking standards of viability
- Prepare a journal article for publication in a peer-reviewed publication. The journal article will be based on the results in the Final Report, to be developed in accordance with Task 1.6.
- Prepare electronic copies of all data and results (including data collected under the testing in Task 5 and any charts or other analysis performed under Task 6.
- Prepare a Summary Memorandum on the Comprehensive Data Analysis of the Test Results to determine trends in the data and corresponding data relationships (to be submitted with the Quarterly Progress Reports).

**Deliverables:**

- Journal article
- Electronic copies of all data and analysis results, including data collected under the testing in Task 5 and any charts or other analysis performed under Task 6
- Summary Memorandum on the Comprehensive Data Analysis of the Test Results