

CONTRACT REQUESTS FORM (CRF)



New Contract 500-11-025 Amendment to Existing Contract: _____ Amendment Number: _____

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	Kiel Pratt	43	916-327-1412	9/29/2009

Contractor's Legal Name	Federal ID Number
DOE- Lawrence Berkeley National Laboratory	94-2951741

Title of Project
Los Angeles Air Force Base Vehicle-to-Grid Demonstration

Term	Start Date	End Date	Amount
New/Original Contract	6/29/2012	6/30/2016	\$ 1,000,000

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	5/9/2012	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Kiel Pratt	Time Needed:	5 minutes

Agenda Item Subject and Description

Possible approval of Contract 500-11-025 for \$1,000,000.00 with Lawrence Berkeley National Laboratory to demonstrate an all-electric non-tactical vehicle fleet at Los Angeles Air Force Base and explore vehicle-to-grid revenue generating capability of such a fleet by participating as fully as possible in California Independent System Operator's ancillary services markets. (ARFVTF funding) Contact: Kiel Pratt. (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

The purpose of this agreement is to: a) demonstrate an all-electric non-tactical vehicle fleet at a military base, and b) explore vehicle-to-grid revenue generating capability of such a fleet by participating as fully as possible in California Independent System Operator's ancillary services markets.

California Environmental Quality Act (CEQA) Compliance

1. Is Contract considered a "Project" under CEQA?
 Yes: skip to question 2 No: complete the following (PRC 21065 and 14 CCR 15378):

2. 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 project has no possibility of having a significant effect on the environment because it will take place at an existing Air Force base and will require procuring approximately five plug-in electric vehicles (that have no emissions) and adding demand response capabilities to existing buildings to demonstrate vehicle-to-grid technologies.

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.

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CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION



Budgets Information								
Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	\$1,000,000	11-12	\$1,000,000	Yes	ARFVTF	10-11	601.118C	\$1,000,000
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$		\$					\$
PIER - NG	\$		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
TOTAL:	\$1,000,000	TOTAL:	\$1,000,000		TOTAL:			\$1,000,000
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Betsy Quayle	Name:	Chris Marnay
Address:	1 Cyclotron Rd Mail Stop 90R2000	Address:	1 Cyclotron Rd Mail Stop 90R1121
City, State, Zip:	Berkeley, CA 94720-8099	City, State, Zip:	Berkeley, CA 94720-8121
Phone/ Fax:	510-486-4218/510-486-4673	Phone/ Fax:	510-486-7705 / 510-486-6996
E-Mail:	BEquayle@lbl.gov	E-Mail:	Chrismarnay@lbl.gov

Contractor Is
<input type="checkbox"/> Private Company (including non-profits) <input type="checkbox"/> CA State Agency (including UC and CSU) <input checked="" type="checkbox"/> Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)

Selection Process Used
<input type="checkbox"/> Solicitation <u>Select Type</u> Solicitation #: _____ # of Bids: _____ Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Non Competitive Bid (Attach CEC 96) <input checked="" type="checkbox"/> Exempt Other Government Entity

Civil Service Considerations
<input type="checkbox"/> Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship) <input checked="" type="checkbox"/> The Services Contracted: <input type="checkbox"/> are not available within civil service <input type="checkbox"/> cannot be performed satisfactorily by civil service employees <input checked="" type="checkbox"/> are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system. <input checked="" type="checkbox"/> The Services are of such an: <input type="checkbox"/> urgent <input type="checkbox"/> temporary, or <input checked="" type="checkbox"/> occasional nature that the delay to implement under civil service would frustrate their very purpose.

Justification:

In order to perform the work under this contract, personnel must have expertise and experience with electric vehicle charging and discharging hardware as well as optimization and control software to facilitate electric vehicle discharging for demand response events. This contract presents a unique, one-time opportunity to fund an early-stage application for heavy-duty electric vehicles for vehicle-to-grid (V2G) functionality at a California military base that will open opportunities to deploy the technology at other California bases. The heavy-duty electric vehicle market is so small that the adoption of V2G techniques to be demonstrated in this project will significantly expand the market and reduce production costs.

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Payment Method			
<input type="checkbox"/>	A. Reimbursement in arrears based on:		
<input type="checkbox"/>	Itemized Monthly	<input type="checkbox"/>	Itemized Quarterly
<input type="checkbox"/>		<input type="checkbox"/>	Flat Rate
<input type="checkbox"/>			One-time
<input checked="" type="checkbox"/>	B. Advanced Payment		
<input type="checkbox"/>	C. Other, explain:		

Retention			
1.	Is contract subject to retention?	<input checked="" type="checkbox"/>	No
		<input type="checkbox"/>	Yes
	If Yes, Do you plan to release retention prior to contract termination?	<input type="checkbox"/>	No
		<input type="checkbox"/>	Yes

Justification of Rates	
The contract price is reasonable, particularly considering the facility provided by the contract terms. The research will be conducted by a national laboratory; salaries and wages are in accordance with costing practice for all Department of Energy programs.	

Disabled Veteran Business Enterprise Program (DVBE)	
1.	<input checked="" type="checkbox"/> Not Applicable
2.	<input type="checkbox"/> Meets DVBE Requirements DVBE Amount:\$ _____ DVBE %: _____
	<input type="checkbox"/> Contractor is Certified DVBE
	<input type="checkbox"/> Contractor is Subcontracting with a DVBE: _____
3.	<input type="checkbox"/> Requesting DVBE Exemption (attach CEC 95)

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?		<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	Yes
If yes, check appropriate box:		<input type="checkbox"/>	SB	<input type="checkbox"/>	MB
		<input type="checkbox"/>	DVBE		

Is Contractor subcontracting any services?		<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	Yes
If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:		TBD			
		<input type="checkbox"/>	No	<input type="checkbox"/>	SB
		<input type="checkbox"/>	MB	<input type="checkbox"/>	DVBE

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
	Conducting the work and evaluating the results of the project will require at least 24 months of data collection, justifying a longer term for the agreement.	<input checked="" type="checkbox"/>	Yes

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 checked="" 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

Task #	CPR	Task Name
1	N/A	Administration
2		Laboratory Establishment Directed to CO ₂ RR Research
3	X	Development and Optimization of CO ₂ RR Molecular Catalysts for Liquid Fuel Production
4	X	Deploy High Throughput Screening Capability for Ligands
5		Develop Membrane and Separation Technology for Liquid Fuel Production
6	N/A	Technology Transfer Activities

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1,2,3,5		Lawrence Berkeley National Laboratory (LBNL)	

GLOSSARY

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

Acronym	Definition
ARFVTP	Alternative and Renewable Fuels and Vehicle Technology Program
CCM	Commission Contract Manager
CH ₄	Methane
CO	Carbon monoxide gas (fuel precursor)
CO ₂ RR	Carbon dioxide reduction reactions. CO ₂ RR is the key to making liquid solar fuels by “cracking” carbon dioxide
Combinatorial Approaches	Refers to a modern technique that involves many small experimental studies undertaken in parallel on the same platform, typically an array of microdots. Used to accelerate the study of relative performance of related but systematically varied systems.
CPR	Critical Project Review
DOE	United States Department of Energy
Energy Commission	California Energy Commission
EtOH	Ethanol

Acronym	Definition
H ₂	Hydrogen gas (fuel precursor)
HCOOH	Formic acid (fuel precursor)
JCAP	Joint Center for Artificial Photosynthesis
Ligand	A molecule or molecular connector, connecting the catalyst molecule to the charged surface, and will be used as a wire to conduct charge.
MeOH	Methanol
UCC.1	Uniform Commercial Code (Financing Statement)

Problem Statement

California is the third-largest consumer of petroleum in the world behind the entire United States and China. By 2020, at current trends, more than 44 million Californians will consume more than 24 billion gallons of gasoline and diesel fuel each year. The consequences for the state are clear: major investments to expand the petroleum infrastructure, more dependency on foreign energy supplies, and decreased environmental and public health quality. The development of low-carbon fuels that can meet demand while reducing carbon dioxide emissions is critical to energy security, environmental security, and economic security for California, the United States and the world. Biofuels are one potential option, but concerns remain about sustainability, practicality, implications of indirect land use issues on the carbon content of the atmosphere, and trade-offs of food for fuel.

Another technological approach would be to produce transportation fuels directly from sunlight through the development of artificial photosynthesis, in which the system performs the same function as plants, but with a robustness and efficiency that is ten times greater than the best-known biological photosynthetic systems. The artificial photosynthetic system would minimize trade-offs between food and fuel, would allow for installation of the systems in a diverse range of sites and environments, and would provide the direct production of a useful chemical fuel from the sun. However, artificial photosynthesis technologies are still in the very early stages and numerous technological issues still need to be resolved.

In 2010, with support from the state of California, the Joint Center for Artificial Photosynthesis (JCAP) was selected to be the United States Department of Energy's (DOE) Fuels from Sunlight Innovation Hub (DE-FOA-0000214). JCAP will lead teams of researchers to solve the key scientific problems involved with the capture, conversion, and storage of sunlight in the form of chemical fuels; to develop the tools and infrastructure that will enable other researchers and companies to rapidly develop artificial photosynthetic systems at a scale capable of meeting U.S. demand; and to develop and rapidly transition the resulting new technologies to the commercial sector.

Goals of the Agreement

The goal of this Agreement is to accelerate the production of liquid fuels via artificial photosynthesis by developing catalysts, linkers, and membranes that are required components for a complete system that produces fuels directly from sunlight.

Objectives of the Agreement

The objectives of this Agreement are to:

- Develop and deploy catalysts to convert carbon dioxide to liquid fuels (DOE-FOA-0000214).
- Design and develop photoelectrochemical membrane layers that provide ionic pathways, good optical and light scattering properties, and are impermeable to the product fuels and to oxygen.

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)

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

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 any additional costs will be borne by the Contractor.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the Commission 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 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.

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:

- Monthly 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 [STYLE MANUAL \(Second Edition\): Preparing Public Interest Energy Research \(PIER\) Program Technical Research Project Reports](#) published on the Energy Commission's web site:

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

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.
- Provide copies of annual reports on the project that are submitted to the Department of Energy within 10 days of final draft submission. The report should not contain confidential information. The contractor does not need to use or follow the Commission Style Manual to create the copies of the annual reports to the Department of Energy.

Deliverables:

- Copy of 2012 annual report to the Department of Energy
- Copy of 2013 annual report to the Department of Energy
- Copy of 2014 annual report to the Department of Energy

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 COMMISSION Style Manual published on the Energy Commission's web site:

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

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 COMMISSION 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 COMMISSION 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 not reimbursable under this Agreement. While the COMMISSION budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits 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)

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 Laboratory Establishment Directed to CO₂RR Research

The goal of this task is to supplement funding provided by the DOE for the JCAP Project (DOE FOA-0000214) to extend the establishment of JCAP Laboratories to include additional capabilities required in tasks 3, 4, and 5.

The Contractor shall:

- Outfit the Molecular Catalysis Laboratory to support CO₂RR experimental activities.
- Establish the High Throughput Experimental Laboratory to test for CO₂RR catalysts.
- Outfit the Membrane Research Laboratory to develop membranes in support of CO₂RR catalysts.
- Extend the Catalyst Benchmarking capability to accommodate CO₂RR testing.
- Prepare a Laboratory Readiness Report that lists the materials and equipment purchased to outfit the laboratory and the purposes of the material and equipment with respect to the activities in this agreement, and discusses the capability of CO₂RR testing and expected throughput.

Deliverables:

- Draft Laboratory Readiness Report
- Final Laboratory Readiness Report

Task 3 Development and Optimization of CO₂RR Molecular Catalysts for Liquid Fuel Production

The goal of this task is to supplement funding provided by the DOE for the JCAP Project (DOE FOA-0000214) to develop molecular catalysts for carbon dioxide reduction, and to evaluate their performance when anchored to light collectors or other electrodes.

The Contractor shall:

- Develop a process to successfully transfer high activity/selectivity molecular catalysts for CO₂RR to a surface-confined environment.
- Analyze data on the interplay between charge transport, mass transport, conformation, and flexibility in promoting high activity of surface.
- Investigate and determine best platforms for deployment of surface-confined molecular catalysts.
- Integrate molecular catalysts into membranes and into an early device.
- Prepare report on Development of CO₂RR Molecular Catalysts for Liquid Fuel Production that summarizes the work in this task and key findings.

Deliverables:

- Draft CO₂RR Molecular Catalysts/Surface Interface for Liquid Fuel Production Report
- Final CO₂RR Molecular Catalysts/Surface Interface for Liquid Fuel Production Report

Task 4 Deploy High Throughput Screening Capability for Ligands

The goal of this task is to supplement funding provided by the DOE for the JCAP Project (DOE FOA-0000214) to perform high throughput screening of proton and CO₂ reduction catalysts to establish the basis for further improvement in CO₂ utilization for solar fuels production.

The Contractor shall:

- Establish a ligand library that diversifies function for electron donation, electron storage, proton relay, and CO₂ binding cofactors.
- Implement high throughput screening for Methanol (MeOH), Ethanol (EtOH), Methane (CH₄) higher liquid fuels and prepare report discussing results on Hydrogen gas (fuel precursor) (H₂), Carbon monoxide gas (CO), Formic acid (HCOOH) and indicate progress in MeOH, EtOH, CH₄ and outstanding questions.
- Use results of these studies to decide best targeted fuels among those tested.
- Develop combinatorial approaches to study tethering groups for anchoring catalysts for future improvement.
- Prepare a Targeted Fuels Report that outlines the method and includes conclusions of combinatorial catalysis resources and best targeted fuels among those tested.

Deliverables:

- Draft Targeted Fuels Report
- Final Targeted Fuels Report

Task 5 Develop Membrane and Separation Technology for Liquid Fuel Production

The goal of this task is to supplement funding provided by the DOE for the JCAP Project (DOE FOA-0000214) to design, demonstrate, and test membrane and separation technology for liquid fuel production.

The Contractor shall:

- Perform research to establish suitable ion-permeable membranes that do not transmit the fuel products.
- Perform research to develop an ion-conductive membrane or a membrane system that will maintain the proper alkaline conditions for fuel production.
- Prepare a Membrane Development report to describe membrane development work and findings.

Deliverables:

- Draft Membrane Development Report
- Membrane Development Report

Task 6 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 Contractor shall:

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

Deliverables:

- Draft Technology Transfer Plan
- Final Technology Transfer Plan