



**CONTRACT REQUEST FORM (CRF)**

CEC-94 (Revised 01/13)

CALIFORNIA ENERGY COMMISSION

**J) Budget Information**

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	14-15	501.0011	\$2,000,000
			\$
			\$
R&D Program Area: EGRO: Transportation		TOTAL:	\$
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

**k) Contractor's Administrator/ Officer**

Contractor's Administrator/ Officer				Contractor's Project Manager			
Name:	Michelle White			Name:	Adewale Oshinuga		
Address:	21865 Copley Dr			Address:	21865 Copley Dr		
City, State, Zip:	Diamond Bar, CA 91765-4178			City, State, Zip:	Diamond Bar, CA 91765-4178		
Phone:	909-396-3259 /	Fax:	- -	Phone:	909-396-2599 /	Fax:	- -
E-Mail:	mwhite@aqmd.gov			E-Mail:	aoshinuga@aqmd.gov		

**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 Other Governmental Entity

**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:**

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

**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 are consistent with other state agencies doing similar research.

**CONTRACT REQUEST FORM (CRF)**



s) Disabled Veteran Business Enterprise Program (DVBE)	
1. <input checked="" type="checkbox"/> Exempt (Interagency/Other Government Entity)	
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"/> Contractor selected through CMAS or MSA with no DVBE participation.	
4. <input type="checkbox"/> 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 agreement, 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 type="checkbox"/> N/A <input checked="" type="checkbox"/> Attached	
7. Resumes	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached	
8. CEC 105, Questionnaire for Identifying Conflicts	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> Attached	

\_\_\_\_\_  
 Agreement Manager                      Date                      Office Manager                      Date                      Deputy Director                      Date

**EXHIBIT A  
SCOPE OF WORK**

**I. TASK ACRONYM/TERM LISTS**

**TASK LIST**

<b>Task #</b>	<b>CPR<sup>1</sup></b>	<b>Task Name</b>
1		General Project Tasks
2		Solicitation Management and Selection of Subcontractor(s)
3	X	Test Vehicle Selection and Experimental Permits
4		Vehicle Activity Protocol
5		In-Use Chassis Dynamometer Emissions Test
6		Engine and After-treatment Technology Deterioration Factors
7	X	Real-World In-Use Emissions Test
8		Technology Impact, Shortfalls, Improvement, and Benefits
9		Comparison of In-Use Emissions and CARB EMFAC Emissions
10		Evaluation of Project Benefits
11		Technology/Knowledge Transfer Activities

**ACRONYMS/GLOSSARY**

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

<b>Acronym</b>	<b>Definition</b>
Basin	South Coast Air Quality Basin
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CARB	California Air Resources Board
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CPR	Critical Project Review
DPF	Diesel Particulate Filter
ECU	Engine Control Unit
EMFAC	CARB Emission Factors
EPA	Environmental Protection Agency
HC	Hydrocarbons
N <sub>2</sub> O	Nitrous Oxide
NH <sub>3</sub>	Ammonia
NO	Nitrogen Monoxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
PM	Particulate Matter
RFP	Request For Proposal
SCR	Selective Catalytic Reduction
TAC	Technical Advisory Committee

**II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES**

<sup>1</sup> Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

## **EXHIBIT A SCOPE OF WORK**

### **A. Purpose of Agreement**

The purpose of this Agreement is to:

- Conduct a competitive solicitation to subcontract technical experts to perform in-use, on-road emissions studies.
- Fund the study of the following that builds upon previous work with the California Air Resources Board (CARB):
  - In-use emissions and fuel usage profile of on-road heavy-duty vehicles.
  - The impact of current technology on fuel consumption and in-use emissions from heavy-duty vehicles used in a variety of applications.

### **B. Problem/ Solution Statement**

#### **Problem**

Heavy-duty engines are broadly classified as natural gas engines with a three-way catalyst; high pressure direct injection dual-fuel engines equipped with a selective catalytic reduction (SCR) system; diesel engines with advanced exhaust gas recirculation system and diesel particulate filter (DPF); and diesel engines with DPF and urea-based SCR systems. While emission measurements of these heavy-duty engines, based on Environmental Protection Agency (EPA) Federal Test Procedures engine dynamometer cycle, are showing oxides of nitrogen (NO<sub>x</sub>) and particulate matter (PM) emissions meeting the United States Environmental Protection Agency and California Air Resources Board (CARB) emissions standards, in-use emissions measurement of the engines operating under load conditions are showing increased emissions of ammonia from natural gas vehicles and of NO<sub>x</sub> from diesel vehicles.

In collaboration with the CARB, South Coast Air Quality Management District is assessing real-world in-use emissions from four heavy-duty vehicles as they are driven over five typical drayage routes in the South Coast Air Basin. As such, additional studies are needed to assess in-use emissions, fuel usage, and the impact of technology on fuel consumption and emissions from natural gas and diesel engines particularly those used in goods movement, refuse hauler, delivery, transit, and school bus applications.

#### **Solution**

The Contractor will conduct an additional study to examine in-use emissions testing and characterize fuel usage of heavy-duty vehicles used in transit, school bus, refuse hauler, and goods movement applications. The test results will be used to:

- Improve inventory for emissions (type, quantities, etc.) and vocation-based drive cycles;
- Develop deterioration factors for engine and after-treatment technologies;
- Identify technology shortfalls and how to mitigate the shortfalls;
- Prioritize staff and financial resources to support advanced engine and after-treatment technologies research and demonstration programs; and
- Match vehicle technologies to vocations for which technology benefits can be maximized.

### **C. Goals and Objectives of the Agreement**

#### **Agreement Goals**

The goals of this Agreement are to:

- Conduct a competitively bid solicitation that seeks at least three bids from responsible bidders to perform on-road, in-use emission and fuel usage testing and analysis.

## EXHIBIT A SCOPE OF WORK

- Characterize on-road, in-use emissions inventory, fuel efficiency, and vocation-based drive cycles for natural gas vehicles;
- Develop deterioration factors for natural gas engines and after-treatment technologies;
- Identify natural gas engine technology shortfalls compared to similar diesel engine technologies and how to improve the shortfalls;
- Prioritize staff and financial resources to support advanced engine and after-treatment technologies research and demonstration programs; and
- Match vehicle technologies to vocations for which technology benefits can be maximized.

**Ratepayer Benefits:** This Agreement will result in the ratepayer benefits of lower costs and improved air quality by in-use emission testing of heavy-duty vehicles operating in California air basins that do not meet ambient air quality standards, particularly communities with high exposure to emissions from medium- and heavy-duty vehicles.

This study will characterize carbon emissions from selected heavy-duty vehicle fleets during real-world duty cycles and assist future efforts in optimizing vocational engine drive cycles for fuel efficiency and lower carbon emissions. Improved efficiency within a fleet can offer significant cost savings, as well as emission reduction benefits. This study will highlight emissions and fuel efficiency of natural gas engine technology and help to remove barriers to deployment of natural gas vehicles in the medium- and heavy-duty vehicles market.

**Technological Advancement and Breakthroughs:** This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals<sup>2</sup> by identifying fuel efficiency and emission issues for fleets. Fleets can use the emission results from this Agreement to prioritize individual vehicles for improved fuel efficiency and reduced emissions. Engine certification emission data are limited to steady state engine test conditions that do not accurately reflect real-world driving cycles; whereas, this study assesses fuel usage and in-use emissions from engines use under vocation-specific drive cycles. The Contractor will use the results from this study to optimize heavy-duty engines for reduced carbon emissions and reduced fuel usage.

### **Agreement Objectives**

The objectives of this Agreement are to:

- Conduct a competitively bid solicitation that seeks at least three bids from responsible bidders;
- Select at most two competitively selected subcontractors to perform on-road, in-use emission and fuel usage testing and analysis;
- Document day-to-day activities of at least 100 heavy-duty vehicles;
- Develop or improve vocation-based drive cycles;
- Obtain in-use emissions and fuel usage of selected heavy-duty vehicles;
- Develop deterioration factors for engine and after-treatment technologies;
- Identify the impact of current and near future technology on engine performance and fuel usage;
- Identify technology shortfalls and how to improve the shortfalls;
- Match vehicle technologies to vocations for which technology benefits can be maximized;
- Obtain real-world in-use emissions from selected heavy-duty vehicles as the vehicles are driven over typical vocation routes; and
- Compare in-use emissions to emissions rates obtained from CARB Emission Factors (EMFAC) model for selected vehicles.

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<sup>2</sup> Assembly Bill 1007 (2007) and Assembly Bill 32 (2006)

# EXHIBIT A SCOPE OF WORK

## III. TASK 1 GENERAL PROJECT TASKS

### **DELIVERABLES**

#### **Subtask 1.1 Deliverables**

The goal of this subtask is to establish the requirements for submitting project deliverables (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Contractor must provide deliverables as required below by the dates listed in the **Schedule of Deliverables (Part V)**. Deliverables that require a draft version are indicated by marking “**(draft and final)**” after the deliverable name in the “Deliverables” section of the task/subtask. If “(draft and final)” does not appear after the deliverable name, only a final version of the deliverable is required. With respect to due dates within this Scope of Work, “**days**” means working days.

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

For deliverables that require a draft version, including the Final Report Outline and Final Report

- Submit all draft deliverables to the CAM for review and comment in accordance with the Schedule of Deliverables (Part V). The CAM will provide written comments to the Contractor on the draft deliverable within 15 days of receipt, unless otherwise specified in the task/subtask for which the deliverable is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final deliverable.
- Submit the revised deliverable with responses and comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For deliverables that require a final version only

- Submit the deliverable to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all deliverables

- Submit all data and documents required as deliverables in accordance with the following:

#### Instructions for Submitting Electronic Files and Developing Software:

##### ○ **Electronic File Format**

Submit all data and documents required as deliverables under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission’s software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

The following describes the accepted formats for electronic data and documents provided to the Energy Commission as deliverables under this Agreement, and establishes the software versions that will be required to review and approve all software deliverables:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.

## EXHIBIT A SCOPE OF WORK

- Text documents will be in MS Word file format, version 2007 or later.
  - Documents intended for public distribution will be in PDF file format.
  - The Contractor must also provide the native Microsoft file format.
  - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **Software Application Development**  
Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
  - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
  - Visual Studio.NET (version 2008 and up). Recommend 2010.
  - C# Programming Language with Presentation (UI), Business Object and Data Layers.
  - SQL (Structured Query Language).
  - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
  - Microsoft SQL Reporting Services. Recommend 2008 R2.
  - XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

### MEETINGS

#### Subtask 1.2 Kick-off Meeting

The goal of this *subtask* is to establish the lines of communication and procedures for implementing this Agreement.

#### The Contractor shall:

- Attend a “*Kick-off*” meeting with the CAM, the Commission Agreement Officer (CAO), and any other Energy Commission staff relevant to the Agreement. The Contractor will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Deliverables (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;

## EXHIBIT A SCOPE OF WORK

- An updated Project Schedule;
  - Deliverables (subtask 1.1);
  - Progress reports and invoices (subtask 1.5);
  - Final Report (subtask 1.6);
  - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  - Any other relevant topics.
- Provide an *Updated Schedule of Deliverables, List of Match Funds, and List of Permits*, as needed to reflect any changes in the documents.

### **The CAM shall:**

- Designate the date and location of the meeting.
- Send the Contractor a *Kick-off Meeting Agenda*.

### **Contractor Deliverables:**

- Updated Schedule of Deliverables (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

### **CAM Deliverable:**

- Kick-off Meeting Agenda

### **Subtask 1.3 Critical Project Review (CPR) Meetings**

The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, deliverables, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Contractor. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Contractor, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Contractor, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

### **The Contractor shall:**

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Deliverables* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 deliverables along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

## EXHIBIT A SCOPE OF WORK

### The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Contractor's input.
- Send the Contractor a *CPR Agenda* and a *List of Expected CPR Participants* in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Contractor with a *Schedule for Providing a Progress Determination* on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, deliverables, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Contractor with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Contractor revise one or more deliverables.

### Contractor Deliverables:

- CPR Report(s)
- Task Deliverables (draft and/or final as specified in the task)

### CAM Deliverables:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

### Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

### The Contractor shall:

- Meet with Energy Commission staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Contractor and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
  - Disposition of any state-owned equipment.
  - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
  - The Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables).
  - Need to document the Contractor's disclosure of "subject inventions" developed under the Agreement.
  - "Surviving" Agreement provisions such as repayment provisions and confidential deliverables.

## EXHIBIT A SCOPE OF WORK

- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Contractor and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Deliverables* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

### Deliverables:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Deliverables

## REPORTS AND INVOICES

### Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

#### The Contractor shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

### Deliverables:

- Progress Reports
- Invoices

### Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review the Final Report, which will be due at least **two months** before the Agreement end date. When creating the Final Report Outline and the Final Report, the Contractor must use the Style Manual provided by the CAM.

#### Subtask 1.6.1 Final Report Outline

#### The Contractor shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. (*See Task 1.1 for requirements for draft and final deliverables.*)

### Contractor Deliverables:

- Final Report Outline (draft and final)

## EXHIBIT A SCOPE OF WORK

### **CAM Deliverables:**

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

### **Subtask 1.6.2 Final Report**

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

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)
    - Acknowledgements page (optional)
    - Preface (**required**)
    - Abstract, keywords, and citation page (**required**)
    - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
    - Executive summary (**required**)
    - Body of the report (**required**)
    - References (if applicable)
    - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
    - Bibliography (if applicable)
    - Appendices (if applicable) (Create a separate volume if very large.)
    - Attachments (if applicable)
  - Ensure that the document is written in the third person.
  - Ensure that the Executive Summary is understandable to the lay public.
    - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
    - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
    - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
  - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
  - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
  - Include a brief description of the project results in the Abstract.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Consider incorporating all CAM comments into the Final Report. If the Recipient

## EXHIBIT A SCOPE OF WORK

disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.

- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

### **Deliverables:**

- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

### **CAM Deliverable:**

- Written Comments on the Draft Final Report

## **MATCH FUNDS, PERMITS, AND SUBCONTRACTS**

### **Subtask 1.7 Match Funds**

The goal of this subtask is to ensure that the Contractor obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Contractor may spend match funds for this task. The Contractor may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Contractor must obtain any associated commitments before incurring any costs for which the Contractor will request reimbursement.

### **The Contractor shall:**

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement.
- 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 this in the letter.

If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
  - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
  - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the 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 must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
- A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.

## EXHIBIT A SCOPE OF WORK

- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

### **Deliverables:**

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (*if applicable*)
- Match Funds Reduction Notification Letter (*if applicable*)

### **Subtask 1.8 Permits**

The goal of this subtask 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, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Contractor may incur any costs related to the use of the permit(s) for which the Contractor will request reimbursement.

### **The Contractor shall:**

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
  - The schedule the Contractor will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project 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 progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

### **Deliverables:**

- Permit Status Letter
- Updated List of Permits (*if applicable*)
- Updated Schedule for Acquiring Permits (*if applicable*)
- Copy of each Approved Permit (*if applicable*)

### **Subtask 1.9 Subcontracts**

## EXHIBIT A SCOPE OF WORK

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

### **The Contractor shall:**

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

### **Deliverables:**

- Subcontracts (*draft if required by the CAM*)

## **TECHNICAL ADVISORY COMMITTEE**

### **Subtask 1.10 Technical Advisory Committee (TAC)**

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
  - Technical area expertise;
  - Knowledge of market applications; or
  - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review deliverables and provide recommendations for needed deliverable adjustments, refinements, or enhancements.
  - Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
  - Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project deliverables.

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that 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 the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;

## EXHIBIT A SCOPE OF WORK

- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

### **The Contractor shall:**

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The 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. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

### **Deliverables:**

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

### **Subtask 1.11 TAC Meetings**

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

### **The Contractor shall:**

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

### **Deliverables:**

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

## EXHIBIT A SCOPE OF WORK

### IV. TECHNICAL TASKS

*Deliverables that require a draft version are indicated by marking “(draft and final)” after the deliverable name in the “Deliverables” section of the task/subtask. If “(draft and final)” does not appear after the deliverable name, only a final version of the deliverable is required. **Subtask 1.1 (Deliverables)** describes the procedure for submitting deliverables to the CAM.*

#### **TASK 2 SOLICITATION MANAGEMENT AND SELECTION OF SUBCONTRACTOR(S)**

The goal of this task is to manage a competitive solicitation and seek at least three responsible applicants in order to select subcontractors who are technical experts that will be capable of conducting in-use emissions testing of heavy-duty alternative fuel (natural gas, propane, electric, and hybrid) and conventional/alternative diesel-fuel engines suitable for heavy duty vehicle vocations according to the goals of this Agreement.

#### **The Contractor Shall:**

- Prepare and provide a draft and final *Program Management Manual*, which will include but not be limited to the following:
  - The Project Selection Process. Project selection must integrate Energy Commission staff into the process, given the Energy Commission’s role as a selection team participant and final conveyor of subcontractor awards to the Energy Commission business meeting. The Contractor must clearly delineate the process by which proposals are received, screened, evaluated, and brought before the Energy Commission for funding recommendation. The Contractor and Energy Commission staff will integrate the project evaluation and selection process.
  - Contract Project Management and Support. The Manual will describe the roles and responsibilities of the Contractor, the award methods and applicability, and the appropriate resource levels (including anticipated travel) to be allocated to project and contract management to ensure the highest quality project work.
  - Program Eligibility. The Contractor will provide an analysis of eligibilities based on business type (such as national research laboratories, small and large private businesses, educational institutions, and non-profit organizations), and provide written recommendations. Final eligibility requirements will be determined at the time the solicitation is prepared.
  - Financial and Credit Screening Criteria. The Contractor will use generally acceptable accounting and financial guidelines to produce screening criteria necessary to maintain the state’s fiduciary responsibilities concerning the funds used for the contract. Such criteria may include, but are not limited to:
    - Past bankruptcies (any in the previous seven years)
    - Adverse credit history
    - Known criminal activity
    - Known rejection or dismissal from any other funding program due to malfeasance
  - Project Selection Criteria. The Contractor will establish project selection criteria using, at a minimum, the following:
    - The concept must be energy-related and must propose RD&D activities that will advance science or technology not adequately provided by competitive and regulated markets
    - The concept must be intended to provide clearly identifiable benefits to California’s ratepayers

## EXHIBIT A SCOPE OF WORK

- The concept must primarily address the Energy Research and Development Natural Gas Transportation subject area or otherwise as identified by the Energy Commission Energy Research and Development Division staff
- The concept must have a reasonable market-connected goal
- The conceptual basis for the project must require a feasibility analysis or performance determination (in the context of its application and within the award amount)

As part of the project selection process, the Contractor will establish a relative weighting system for scoring proposals using the selection criteria. In addition, the Contractor will identify personnel responsible for scoring proposals and making final recommendations for funding. The Contractor will ensure that Energy Commission staff are integrated into the project selection and scoring process.

- Subcontractor Terms and Conditions  
The Contractor will establish terms and conditions for Subcontractors that are acceptable to the Energy Commission. The Subcontractor Terms and Conditions are subject to Commission Agreement Manager approval and must comply with the requirements set forth in the standard terms and conditions in Attachment D.
- Issue a *Request for Proposals (RFP)* developed with input from the Energy Commission and other funding partners, and include project requirements, scoring criteria, and any additional information that should be provided to prospective applicants. After receiving written direction from the Commission Contract Manager, release and advertise the RFP.
  - Seek applications from at least three responsible bidders.
  - Using the scoring criteria developed by South Coast Air Quality Management District in conjunction with the Energy Commission, competitively score and rank the submitted projects based on input and scores provided by the Energy Commission and other funding partners.
  - Designated staff from the Energy Commission will be part of the Contractor's selection team for all solicitations. The Energy Commission's role in project selection will encompass both the technical and cost elements of the subcontractor (s) award. The participating Energy Commission staff must be satisfied that the technical cost elements of the subcontract are reasonable and justifiable before recommending the subcontractor award for Energy Commission approval.
- Prepare a *Subcontractor Project Recommendation* for each selected project award and provide the package to the Commission Contract Manager. Each project recommendation shall, at minimum, contain the following:
  - A sequential identification number
  - A funding justification
  - A project scope of work and schedule
  - A project budget showing all proposed expenditures of funds and uses and costs of all facilities and expertise
  - Present facts pertaining to these proposed projects to Commission Energy Research and Development Division Management, the appropriate Lead Commissioner and/or to the full Energy Commission at its business meeting. The Energy Commission in conjunction with the other funding partners will decide which projects to fund.

## EXHIBIT A SCOPE OF WORK

- Develop a *List of Ranked Subcontractors and Funding Amounts* based on approval of the Energy Commission. This list is used to inform awardees that they have been approved for an award.
  - Prepare subcontracts.

### **Deliverables:**

- Program Management Manual (draft and final)
- Copy of Final RFP
- Subcontractor Project Recommendation
- List of Ranked Subcontractors and Funding Amounts

### **TASK 3 TEST VEHICLE SELECTION AND EXPERIMENTAL PERMITS**

The goals of this task are to: (1) develop a test vehicle recruitment protocol; and (2) recruit test vehicles.

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

- Work with the subcontractor(s) to develop a *Test Vehicle Recruitment Protocol* to determine the test worthiness of each test vehicle. The protocol shall include, at a minimum, procedures for performing:
  - Vehicle safety inspection;
  - Vehicle maintenance and usage history;
  - A series of acceleration, cold start, and idle tests;
  - Fault code reading and diagnosis to identify active or inactive engine codes; and
  - Engine control unit (ECU) screening to identify engine sensor or emission control device failure.
- Work with the subcontractor(s) to select at least 100 test vehicles based on the test vehicle recruitment protocol and prepare and provide a *Test Vehicle Matrix* that includes but is not limited to the following:
  - Test vehicle ownership, vocation, model year, gross vehicle weight rating, and odometer reading;
  - Engine make, family, model, model year, serial number, displacement, maximum rated power, certification level; and
  - Fuel type.
- Work with the subcontractor(s) to obtain all necessary *Experimental Permits* from appropriate agencies and provide copies to CAM.
- Participate in the CPR meeting and prepare *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings)

#### **Deliverables:**

- Test Vehicle Recruitment Protocol
- Test Vehicle Matrix
- Copies of Experimental permits, if necessary
- CPR Report #1

### **TASK 4 VEHICLE ACTIVITY PROTOCOL**

The goals of this task are to: (1) develop a test vehicle activity protocol; (2) establish test vehicle activity; and (3) assess effectiveness of existing vocation-based drive cycle.

## EXHIBIT A SCOPE OF WORK

### The Contractor shall:

- Work with the subcontractor(s) to develop and provide a *Test Vehicle Activity Protocol* to establish the driving history of each test vehicle and driving characteristics of each fleet/vocation. The protocol shall provide a detailed description of the tools and procedures for:
  - Gathering in-use vehicle activity data and in-use continuous emissions data;
  - Interpreting vehicle activity data and in-use emissions data and adhering to accepted quality assurance/quality control standards; and
- Work with the subcontractor(s) to assess the effectiveness of existing vocation-based drive cycles based on the test vehicle activity data and develop, improve, or retain existing drive cycles and provide *Written Recommendations on Vocation-Based Drive Cycles*.

### Deliverables:

- Test Vehicle Activity Protocol
- Written Recommendations on Vocation-Based Drive Cycles

### TASK 5 IN-USE CHASSIS DYNAMOMETER EMISSION TESTS

The goals of this task are to: (1) prepare an emission test plan; and (2) conduct in-use emissions test of heavy-duty vehicles.

### The Contractor shall:

- Work with the subcontractor(s) to prepare and provide a detailed *Emission Test Plan* for conducting a chassis dynamometer testing of selected electric and hybrid and liquid- and gaseous-fueled heavy-duty vehicles used in goods movement, refuse hauler, delivery, transit, and school bus applications. The plan shall provide a detailed description of:
  - Test cycles
  - Type and purpose of each sensor to be instrumented on test vehicles;
  - Chassis dynamometer test procedure including test vehicle setup, coastdown procedure, and test procedure;
  - Procedures for collecting and measuring all data necessary to determine:
    - Vehicle distance specific fuel consumption (ECU data broadcasts, directly measured, and derived from the chassis dynamometer emissions tests);
    - Total hydrocarbons (HC), methane and nonmethane emissions;
    - Nitrogen monoxide (NO), nitrous oxide (N<sub>2</sub>O), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), ammonia (NH<sub>3</sub>), PM, and ultrafine emissions;
    - Benzene, toluene, ethylbenzene, xylene, formaldehyde, acetaldehyde, and carbonyls emissions;
    - Gravimetric analysis of PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub>, and total PM;
    - PM concentration and size distributions; and
    - Chemical characterization of PM – elemental and organic analyses.
- Work with the subcontractor(s) to conduct in-use emission test of selected test vehicles based on the emission test plan and prepare an *Emission Test Report* that includes but is not limited to the following:
  - Vehicle distance specific fuel consumption (ECU data broadcasts, directly measured, and derived from the chassis dynamometer emissions tests);
  - Total HC, methane and non-methane emissions;
  - NO, N<sub>2</sub>O, NO<sub>2</sub>, CO, CO<sub>2</sub>, NH<sub>3</sub>, PM, and ultrafine emissions;

## EXHIBIT A SCOPE OF WORK

- Benzene, toluene, ethylbenzene, xylene, formaldehyde, acetaldehyde, and carbonyls emissions;
- Gravimetric analysis of PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub>, and total PM;
- PM concentration and size distributions; and
- Chemical characterization of PM – elemental and organic analyses.

### **Deliverables:**

- Emission Test Plan
- Emission Test Report

### **TASK 6 ENGINE AND AFTER-TREATMENT TECHNOLOGY DETERIORATION FACTORS**

The goals of this task are to: (1) develop a deterioration factor test plan; and (2) determine the deterioration factors for engine and after-treatment technologies.

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

- Work with the subcontractor(s) to prepare and provide a detailed *Deterioration Factor Test Plan* to determine the deterioration factors of engine and after-treatment technologies for selected heavy-duty vehicles. The plan shall provide a detailed description of the procedures or methods for :
  - Selecting vehicles and engine and after-treatment technologies;
  - Establishing vehicle in-service accumulation schedule;
  - Collecting emission-related and non-emission-related scheduled and non-scheduled maintenance history within the in-service accumulation period;
  - Conducting *Emission Test Plan* that includes test procedures, drive cycles, data collection procedures, data analyses, and data evaluation; and
- Work with the subcontractor(s) to conduct an emission test for gaseous and PM emissions of selected test vehicles based on the *Emission Test Plan* and prepare and provide a *Deterioration Factor Test Report* that includes but is not limited to the following:
  - Selected vehicles and engine and after-treatment technologies;
  - Emission test results for vehicle distance specific fuel consumption and gaseous and PM emissions;
  - Deterioration factors for gaseous and PM emissions of each selected vehicle and engine and after-treatment technologies.

### **Deliverables:**

- Deterioration Factor Test Plan
- Deterioration Factor Test Report

### **TASK 7 REAL-WORLD IN-USE EMISSION TESTS**

The goals of this task are to: (1) prepare a real-world in-use emission test plan; and (2) conduct real-world in-use emissions test of heavy-duty vehicles as the vehicles are driven over selected vocation routes.

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

- Work with the subcontractor(s) to prepare and provide a detailed *Real-World In-Use Emission Test Plan* for conducting a real-world in-use emissions testing of heavy-duty vehicles. The plan shall provide a detailed description of:
  - Method for selecting vehicles and test routes;

## EXHIBIT A SCOPE OF WORK

- Procedures, methods, and tools for determining road topology, grades, and ambient conditions;
- Mobile test laboratory and hardware setup;
- Type and purpose of each sensor to be instrumented on test vehicles;
- Test procedures for collecting and measuring all data necessary to determine:
  - Vehicle distance specific fuel consumption (ECU data broadcasts, directly measured, and derived from the chassis dynamometer emissions tests);
  - Total HC, methane and non-methane emissions;
  - NO, N<sub>2</sub>O, NO<sub>2</sub>, CO, CO<sub>2</sub>, NH<sub>3</sub>, PM, and ultrafine emissions;
  - Benzene, toluene, ethylbenzene, xylene, formaldehyde, acetaldehyde, and carbonyls emissions;
  - Gravimetric analysis of PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub>, and total PM;
  - PM concentration and size distributions; and
  - Chemical characterization of PM – elemental and organic analyses.
- Work with the subcontractor(s) to conduct real-world in-use emission test of selected test vehicles based on the real-world in-use emission test plan and prepare an *Real-World In-Use Emission Test Report* that includes but is not limited to the following:
  - Vehicle distance specific fuel consumption (ECU data broadcasts, directly measured, and derived from the chassis dynamometer emissions tests);
  - Total HC, methane and non-methane emissions;
  - NO, N<sub>2</sub>O, NO<sub>2</sub>, CO, CO<sub>2</sub>, NH<sub>3</sub>, PM, and ultrafine emissions;
  - Benzene, toluene, ethylbenzene, xylene, formaldehyde, acetaldehyde, and carbonyls emissions;
  - Gravimetric analysis of PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub>, and total PM;
  - PM concentration and size distributions; and
  - Chemical characterization of PM – elemental and organic analyses.
- Participate in the CPR meeting and prepare *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings)

### **Deliverables:**

- Real-World In-Use Emission Test Plan
- Real-World In-Use Emission Test Report
- CPR Report #2

### **TASK 8 TECHNOLOGY IMPACT, SHORTFALL, IMPROVEMENT, AND BENEFITS**

The goals of this task are to: (1) identify the impact of current and near future technology on engine performance, emissions, and fuel usage; (2) establish engine and after-treatment technologies' shortfalls and how to mitigate the shortfalls; and (3) match vehicle technologies to vocations for which technology benefits can be maximized.

#### **The Contractor shall, based on the test results in Tasks 4 and 6:**

- Work with the subcontractor(s) to identify the impact of current and near term technology on engine performance, emissions, and fuel usage;
- Work with the subcontractor(s) to establish and prepare an analysis of engine and after-treatment technologies' shortfalls and recommendations on how to mitigate the shortfalls; and
- Work with the subcontractor(s) to prepare a list of matched vehicle technologies to vocations for which technology benefits can be maximized.
- Prepare and provide a *Technology Impact, Shortfall, Improvement and Benefits Report* that addresses the activities described under this task.

## EXHIBIT A SCOPE OF WORK

### Deliverables:

- Technology Impact, Shortfall, Improvement and Benefits Report

### TASK 9 COMPARISON OF IN-USE EMISSIONS AND CARB EMFAC EMISSIONS

The goal of this task is to prepare an in-use emission protocol to compare chassis-dynamometer-based in-use emissions and real-world in-use emissions to EMFAC emissions from selected heavy-duty vehicles

#### The Contractor shall:

- Work with the subcontractor(s) to prepare and provide a detailed *In-Use Emission Protocol* for comparing chassis-dynamometer-based in-use emissions and real-world in-use emissions to EMFAC emissions from selected heavy-duty vehicles used in goods movement, refuse hauler, delivery transit, and school bus applications. The plan shall provide a detailed description of:
  - Procedures or methods for selecting vehicles; and
  - Procedures for collecting, measuring, and evaluating all data necessary to compare chassis-dynamometer-based in-use emissions and real-world in-use emissions to EMFAC emissions from selected vehicles.
- Work with the subcontractor(s) to prepare and provide an *In-Use Emission Comparison Test Report* detailing the result of comparing chassis-dynamometer-based in-use emissions and real-world in-use emissions to EMFAC emissions from the selected heavy-duty vehicles.

### Deliverables:

- In-Use Emission Protocol
- In-Use Emission Comparison Test Report

### TASK 10 EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

#### The Contractor shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
  - For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
    - Greenhouse gas and criteria emissions reductions.

## EXHIBIT A SCOPE OF WORK

- Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
- Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
- A discussion of project product downloads from websites, and publications in technical journals.
- A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Additional Information for Product Development Projects:
  - Outcome of product development efforts, such copyrights and license agreements.
  - Units sold or projected to be sold in California and outside of California.
  - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
  - Investment dollars/follow-on private funding as a result of Energy Commission funding.
  - Patent numbers and applications, along with dates and brief descriptions.
- Additional Information for Product Demonstrations:
  - Outcome of demonstrations and status of technology.
  - Number of similar installations.
  - Jobs created/retained as a result of the Agreement.
- For Information/Tools and Other Research Studies:
  - Outcome of project.
  - Published documents, including date, title, and periodical name.
  - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
  - The number of website downloads.
  - An estimate of how the project information has affected energy use and cost, or has resulted in other non-energy benefits.
  - An estimate of energy and non-energy benefits.
  - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
  - A discussion of project deliverable downloads from websites, and publications in technical journals.
  - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Contractor similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

### **Deliverables:**

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

## EXHIBIT A SCOPE OF WORK

### **TASK 11: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES**

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

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

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
  - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
  - A description of the intended use(s) for and users of the project results.
  - Published documents, including date, title, and periodical name.
  - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
  - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
  - The number of website downloads or public requests for project results.
  - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop on the results of the project.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

#### **Deliverables:**

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

## **V. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

**RESOLVED**, that the State Energy Resources Conservation and Development Commission (Energy Commission) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

**RESOLVED**, that the Energy Commission approves Agreement 500-15-002 with South Coast Air Quality Management District for a \$2,000,000 contract to conduct on-road, in-use emission and fuel usage testing for heavy duty natural gas vehicles; and

**FURTHER BE IT RESOLVED**, that the Executive Director or his/her designee shall 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 December 9, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Tiffani Winter,  
Secretariat