

CONTRACT AMENDMENT REQUEST FORM (CARF)

CEC-276 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION



Original Agreement #	600-10-002	Amendment #	2
----------------------	------------	-------------	---

Division	Agreement Manager:	MS-	Phone
600 Fuels and Transportation Division	Juan Garcia	27	916-654-3915

Contractor's Legal Name	Federal ID Number
The Regents of the University of California, Irvine	95-2226406

Revisions: (check all that apply)		
<input checked="" type="checkbox"/> Term Extension	New End Date: 3 / 31 / 2018	Include revised schedule and complete items A, B, C, D, & H below.
<input checked="" type="checkbox"/> Budget Augmentation	Amendment Amount: \$ 360,000	Include revised budget and complete items A, B, C, D, E, F, & H below.
<input type="checkbox"/> Budget Reallocation		Include revised budget and complete items A, B, C, D, & H below.
<input checked="" type="checkbox"/> Scope of Work Revision		Include revised scope of work and complete items A, B, C, D, & H below.
<input type="checkbox"/> Change in Project Location or Demonstration Site		Include revised scope of work and complete items A, B, C, D, G, & H below.
<input type="checkbox"/> DVBE Replacement		Include revised scope of work and complete items A, B, C, D, F, & H below.
<input type="checkbox"/> Novation/Name Change of Prime Contractor/Recipient		Include novation documentation and complete items A, C, D, & H below.
<input checked="" type="checkbox"/> Terms and Conditions Modification		Include applicable exhibits with bold/underline/strikeout and complete items A, B, C, D, & H below.

A) Business Meeting Information**Business Meeting approval is not required for the following types of Agreements:**

- Operational agreement (see CAM Manual for list) to be approved by Executive Director
- ARFVTP minor amendments delegated to Executive Director.

Proposed Business Meeting Date	12 / 10 / 2014	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Juan Garcia	Time Needed:	5 minutes

Please select one list serve. Altfuels (AB118- ARFVTP)

Agenda Item Subject and Description

Proposed resolution approving Amendment 2 to Contract 600-10-002 with the Regents of the University of California, Irvine to extend the term of the contract for 3 years, revise the scope of work, and augment the budget. This amendment will provide continued technical support to the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) in planning and evaluating the early network of hydrogen refueling stations, other alternative fuels refueling infrastructure, and also develop additional air quality impact analyses to develop more information on public health benefits associated with ARFVTP investments.

B) Amendment Justification (For contract amendments only)

- Non Competitive Bid (Attach CEC 96)
- Exempt Interagency

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

Legal Company Name:	Budget	SB	MB	DVBE
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D) List all key partners: (attach additional sheets as necessary)

Legal Company Name:

E) Budget Information (only include amendment amount information)

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
ARFVTF	13/14	600.118C	\$360,000
Funding Source			\$
R&D Program Area:	N/A	TOTAL:	\$360,000

CONTRACT AMENDMENT REQUEST FORM (CARF)



Explanation for "Other" selection	
Reimbursement Contract #:	Federal Agreement #:

F) Disabled Veteran Business Enterprise Program (DVBE)

1. Exempt (Interagency/Other Government Entity)
2. Meets DVBE Requirements DVBE Amount:\$ _____ DVBE %: _____
 - Contractor is Certified DVBE
 - Contractor is Subcontracting with a DVBE: _____
3. Contractor selected through CMAS or MSA with no DVBE participation.
4. Requesting DVBE Exemption (attach CEC 95)

G) California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
 - Yes (skip to question 2)
 - No (complete the following (PRC 21065 and 14 CCR 15378):
 Explain why Agreement is not considered a "Project":
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because the scope of work involves the enhancement of an existing computer model.
2. If Agreement is considered a "Project" under CEQA:
 - a) Agreement **IS** exempt. (Attach draft NOE)
 - Statutory Exemption. List PRC and/or CCR section number: _____
 - Categorical Exemption. List CCR section number: _____
 - Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why Agreement is exempt under the above section: _____
 - b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
 Check all that apply

<input type="checkbox"/> Initial Study	<input type="checkbox"/> Environmental Impact Report
<input type="checkbox"/> Negative Declaration	<input type="checkbox"/> Statement of Overriding Considerations
<input type="checkbox"/> Mitigated Negative Declaration	

H) The following items should be attached to this ARF (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 95, DVBE Exemption Request	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEQA Documentation	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
6. Novation Documentation	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
7. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> Attached

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date
-------------------	------	----------------	------	-----------------	------

**EXHIBIT A
SCOPE OF WORK**

TASK LIST

Task#	CPR	Task Name
1	X	Agreement Management
2		Expand STREET
3		Construct Vehicle and Fuel Infrastructure Modules
4		Develop Vehicle and Fuel Infrastructure Scenarios
5		Perform Parametric Variations within STREET
6		Develop Strategy for Web-based STREET Model
7		Establish Comprehensive High-Resolution Infrastructure Plan and Capability for Alternative Fuels
8		Develop a Web-Based STREET Model Interface
9	X	Hydrogen Refueling Station Location Planning and Evaluation

GLOSSARY OF ACRONYMS

Acronym	Definition
APEP	Advanced Power and Energy Program, University of California, Irvine
AQMD	Air Quality Management District
ARFVTP	Alternative and Renewable Fuel and Vehicle Technology Program
BAAB	Bay Area Air Basin
CCM	Commission Contract Manager
CEC	California Energy Commission
CPR	Critical Project Review
DOE	United States Department of Energy
GHG	Greenhouse Gases
ICE	Internal Combustion Engine
PCA	Preferred Combination Assessment
SJVAB	San Joaquin Valley Air Basin
SoCAB	South Coast Air Basin
STREET	Spatially and Temporally Resolved Energy and Environment Tool
UCI (Contractor)	University of California, Irvine

GLOSSARY OF TERMS

Term	Definition
High Resolution	High resolution capability refers to the spatial and temporal detail of the model (e.g., 1 hour and 5 km resolution for GHG and emissions results, street corner resolution for infrastructure placement)
Holistic	Analysis of all facets of a broad integrated system
Module	A building block of STREET
Parametric	Analysis method by which numerous computations are performed by changing parameters

Term	Definition
Realistic Scenarios	Spatially and temporally resolved future-year vehicle, and infrastructure scenarios that are likely to occur based on current trends
Spanning Scenarios	Spatially and temporally resolved scenarios that are relatively unlikely, though technologically feasible and that allow a limiting impact of vehicles, fuels and /or infrastructure to be gauged.
Spatial	Geographic location of emission sources, infrastructure and energy use
Temporal	The time of day or year that energy is used and emissions are released

GOALS OF THE AGREEMENT

The goals of this Agreement are to:

- Expand the existing Spatially and Temporally Resolved Energy and Environment Tool (STREET) analysis tool: (A) from a South Coast Air Basin (SoCAB) focus to one that includes multiple air basins/regions, throughout all of California, and (B) to analyze a variety of emerging alternative vehicle and fuel options and technology rollout scenarios, as prescribed by the California Energy Commission (Energy Commission).
- Use STREET to parametrically and holistically assess spatially- and temporally resolved greenhouse gas and criteria pollutant emissions, energy use, petroleum displacement, and air quality for several future alternative vehicle scenarios in California.

OBJECTIVES OF THE AGREEMENT

The objectives of this Agreement are to:

- Expand STREET from a regional (air basin) perspective to a State perspective in order to provide the following attributes:
 - Scoping analyses by providing energy consumption, resource consumption and associated emissions as a function of selected parameters and parametric variations of interest
 - Support, as justified, second order “detailed” air quality analyses in major California air sheds
- Construct additional modules for the STREET framework, as requested by the Commission Contract Manager (CCM) to gain insights into a variety of proposed vehicles and vehicle fueling infrastructure options such as biofuels, gaseous hydrocarbons, and varying degrees of vehicle electrification,
- Using the expanded STREET, analyze statewide impacts of the various options upon greenhouse gas emissions, petroleum displacement, resource use, and air quality for any desired vehicle and fueling technology or technology mix, and
- Perform parametric variations using the expanded STREET to assess the different energy and environmental impacts of infrastructure permutations in an effort to discover preferred coordinated vehicle and infrastructure rollout scenarios.

- **Use STREET to provide support to the California Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) air quality impact assessments.**
- **Use STREET to provide support for future Energy Commission solicitations.**

BACKGROUND

Faculty and staff from the Advanced Power and Energy Program (APEP) at the University of California, Irvine (UCI) have developed the UCI STREET model under previous research programs funded by Energy Commission Public Interest Energy Research grants and by others. STREET is a tool designed for policy and planning purposes in the field of alternative fuels. The STREET computer model considers, in extreme detail, which fuels vehicles may use, where the fuels are made, where feedstocks and resources come from, how they are transported and along which routes, and where fueling stations might be located. The model can also determine what changes must occur to achieve a desired result.

The purpose of this agreement is to expand the existing STREET to cover the following alternative fuels: Hydrogen, natural gas, ethanol, biomethane/biogas, propane, biodiesel/renewable diesel, and electricity. It is also the purpose of this agreement to expand the existing STREET to cover all of California. The Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program (Program) will fund this agreement. The project will address policy decisions regarding strategic placement of alternative fuel vehicles, and alternative fuel distribution and fueling infrastructure. In addition, it will create a model that will eventually serve as a user interface for Energy Commission staff and the general public.

The deployment of new transportation systems and fuels will require a broadly coordinated effort and substantial capital investment of private and public funds. This may include the implementation of new stationary power generation and distribution technologies in California as well. As a result, it is important to plan a clear strategy that will most effectively lead to greenhouse gas reductions and petroleum use reduction, and that will support the air quality goals driving this effort. The analytical capabilities of STREET can be used by Energy Commission staff to determine environmental impacts to better inform decisions regarding diverse technology investment and funding strategies.

Funding support from three programs was used to develop and implement key attributes of STREET. The first and foremost is the multi-year funding support of the Commission program to develop, in collaboration with the California Air Resources Board and the South Coast Air Quality Management District, the methodology to characterize and assess air quality impacts associated with power generation and transportation alternatives. The second is funding support from the California Department of Transportation for the development and implementation of a methodology to establish the number and locations of fueling stations in a given community. The third is the U.S. Department of Energy (DOE) funding support that addressed the foundation of STREET, namely the development and implementation of

the “Preferred Combination Assessment (PCA)” methodology. All three programs have been successfully completed.

The application of the STREET methodology to hydrogen infrastructure deployment in the SoCAB has established that it is robust, readily adaptable to the variety of parameters and technologies that must be included, and effective at establishing the needed insights.

The current and potential capabilities of STREET can directly inform the Program initiatives by assessment of vehicle and fuel infrastructure scenarios of interest to the Energy Commission. This scope of work describes an initial three-year effort to formally establish and utilize STREET in the Energy Commission’s Program, and to determine if both the utility and applicability of STREET justify continued use beyond the three-year duration of the project. The vehicles/fuels of immediate consideration are electric drive/electricity, fuel cell/hydrogen, Internal Combustion Engine (ICE)/hydrogen, ICE/ethanol, ICE/renewable diesel/biodiesel, ICE/natural gas, and ICE/propane. The scope of work allows for expansion to other alternative fuels as needed.

The first amendment will extend the term of this Agreement by one year in order to complete the additional research tasks. The two new tasks will develop a web-based application for Energy Commission staff use when the staff considers the placement of fueling stations and expand the STREET accuracy to a higher resolution. With the new capability, staff will be able to create scenarios based on the impacts of placing compressed natural gas (CNG), biofuels, electric charging, and hydrogen stations, and infrastructure for other alternative transportation fuels and technologies. At the same time, STREET supports analyses of upstream and downstream environmental impacts to account for mandated ARFVTP goals.

The second amendment inserts additional assignments for Task 4, adds a new task, Task 9 (Hydrogen Refueling Station Location Planning and Evaluation), and extends the term of this Contract by three years to complete Task 9. The addition to Task 4 will allow for more specific objectives desired by the ARFVTP staff regarding air quality impact assessments. The new task (Task 9) will allow the Contractor to provide continued support to the Energy Commission’s ARFVTP solicitation processes until the end of March, 2018.

SCOPE OF WORK TASKS

TASK 1 AGREEMENT MANAGEMENT

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 CCM, the Commission Project Technical Lead, the Contracts Officer, and a representative of the Accounting Office. UC Irvine (Contractor) shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the CCM to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the CCM 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
- Critical Project Review (CPR) Meetings (Task 1.2)

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

- The CCM’s and the Commission Project Technical Lead’s expectations for accomplishing tasks described in the Scope of Work;
- The Schedule of Deliverables and Due Dates (update as required)
- Quarterly Progress Reports (Task 1.4)
- Deliverables (Task 1.5)
- Final Report (Task 1.6)
- Technical Tasks (Tasks 2 through 6)

The CCM shall designate the date and location of this meeting.

Contractor Deliverable:

- Updated Schedule of Deliverables (as required)

Task 1.2 Critical Project Review 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.

Critical Project Review (CPR) meetings provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs will take place annually, beginning one year from the start date of this Agreement, unless the CCM determines otherwise. The CCM may schedule additional CPRs as necessary, and, if necessary, the budget will be reallocated to cover the additional costs borne by the Contractor, but the overall contract amount will not increase.

Participants include the CCM, the Commission Project Technical Lead, and the Contractor, and may include other Energy Commission staff and management selected by the CCM to provide support to the Energy Commission.

The CCM 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.
- 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, subject to the Terms and Conditions on amendments to the agreement. If the CCM concludes that the project needs a formal amendment, that satisfactory progress is not being made and the project needs to be ended, or that the project does not meet the needs of the Energy Commission and a stop work should issue, these conclusions will be referred to the **Lead Commissioner for** Transportation for **his or her** concurrence.
- 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 and submit 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 to the CCM 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)

CCM Deliverables:

- Written Determination

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Contractor shall:

- Meet with the CCM 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 and the CCM. 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 CCM.

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

The administrative portion of the meeting shall be a discussion with the CCM about the following Agreement closeout items (if applicable):

- What to do with any state-owned equipment (Options), if applicable
 - CCM's request for specific "generated" data (not already provided in Agreement deliverables)
 - "Surviving" Agreement provisions
 - Final invoicing
- Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:

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

REPORTING TASKS

Task 1.4 Quarterly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement.

The Contractor shall:

- Prepare and submit quarterly 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. (See Attachment A-2) Each progress report is due to the CCM within 10 working days after the end of the reporting period.

Deliverables:

Quarterly Progress Reports

Task 1.5 Deliverables

The goal of this task is to set forth the general requirements for submitting deliverables, unless described differently in the tasks descriptions.

When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the CCM, the latest version of the Commission's Style Manual published on the Energy Commission's website at:

http://www.energy.ca.gov/contracts/consultant_reports/index.html

The Contractor shall:

- When directed to submit both a draft and final deliverable under the Scope of Work, submit a draft of each deliverable to the CCM for review and comment in accordance with the approved Schedule of Deliverables. The CCM will provide written comments back to the Contractor on the draft deliverable within 15 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the CCM, who shall provide written approval (or dispute) of the final deliverable within 10 working days of receipt.

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 CCM and Commission Project Technical Lead will review and approve the Final Report. The Final Report must be completed before the termination date of the Agreement, in accordance with the Schedule of Deliverables and Due Dates.

The Final Report shall follow the approved outline and the latest version of the Final Report guidelines as published on the Energy Commission's website. The current guidelines are published at:

http://www.energy.ca.gov/contracts/consultant_reports/index.html

The contractor shall use the latest version of these guidelines that is available at the time the Recipient begins performing this task, unless otherwise instructed in writing by the CCM.

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.

The Contractor shall:

- Prepare and submit the Draft Final Report
- Prepare and submit the Final Report

Deliverables:

- Draft Final Report
- Final Report

ELECTRONIC FILE FORMAT

Task 1.7 Electronic File Format

The goals of this task are to unify the formats of electronic data and documents provided to the CCM as contract deliverables, and 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 CCM in the following formats:
 - Data sets shall be in Microsoft Office file formats. All deliverable files must be saved in MS Office 2007 or earlier format(s). For MS Access data files, data set file size, quality, and length must be specified.
 - 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:

- Exemption Request(s) (if applicable)

TECHNICAL TASKS

TASK 2 Expand STREET

The goal of this task is to expand STREET analytical capabilities, previously developed only for the SoCAB, to encompass the entire state of California. The product will be the revised STREET that is fully operational to assess vehicle and fueling options regionally and throughout the state of California.

The Contractor shall:

- Expand the Preferred Combination Assessment (PCA) methodology within STREET, which was developed for SoCAB for all alternative fuels, to a statewide analysis tool as directed by the CCM.
- Configure existing air quality simulation tools for the SoCAB, the SJVAB, and the BAAB, such that the expanded PCA results can be readily applied.
- Prepare a report detailing the expansion of STREET to encompass the entirety of California. The report shall include:
 - Detailed explanation of PCA methodology and the steps taken to expand the capability to include all of California.
 - Detailed description of air quality modeling methodology and configuration of simulation tools required to model each California air basin.
- Prepare and submit a Power Point Presentation that includes the Final STREET Expansion Report.
- Present the PowerPoint at a workshop and participate in a discussion about the scope and direction of the work. Demonstrations shall be included as needed. The time, date, and location of the workshop will be determined by the CCM, but generally will take place at the Energy Commission.

Deliverables:

- Draft STREET Expansion Report
- Final STREET Expansion Report
- STREET Expansion Power Point Presentation

TASK 3 Construct Vehicle and Fuel Infrastructure Modules

The goal of this task is to construct new alternative vehicle and alternative fueling infrastructure modules and incorporate them into the STREET framework. This will allow the user to holistically analyze pertinent vehicle and fuel infrastructure scenarios such as vehicle electrification, increased use of natural gas, and expanded biodiesel opportunities. The Contractor and the CCM will work together to develop various alternative transportation scenarios and vehicle rollout plans. The work products will include modules for electric drive/electricity, fuel cell/hydrogen, ICE/hydrogen, ICE/ethanol, ICE/renewable diesel/biodiesel, ICE/natural gas, and ICE/propane. The modular framework of STREET readily allows the Contractor and the Energy

Commission to interactively determine and model a wide range of vehicle and fuel infrastructure combinations.

The Contractor shall:

- Expand the PCA methodology by developing additional STREET modules to include the transportation fuels identified in the *2010-2011 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program*.
<http://www.energy.ca.gov/2010publications/CEC-600-2010-001/CEC-600-2010-001-CTF.PDF>
- Prepare a STREET Module Development Report detailing the development of the following street modules:
 - Fuel cell/hydrogen, ICE/hydrogen,
 - Replicate the fuel cell vehicle and hydrogen infrastructure scenarios previously developed for SoCAB for the entire state.
 - Electric drive/electricity
 - Model the impacts of electric vehicle charging profiles by incorporating the temporal resolution of current electric infrastructure in combination with additional future power generation technologies.
 - ICE/natural gas (or Biomethane/Biogas), and ICE/propane
 - Model fuel production, delivery, and dispensing of natural gas fuels (CNG, LNG) and Propane using the methods similar to those used to model hydrogen.
 - ICE/ethanol (or gasoline substitutes/renewable hydrocarbons), ICE/renewable diesel/biodiesel (or diesel substitutes/renewable hydrocarbons)
 - Analyze bio-fuel production and distribution.
- Consider at least two additional potential fuels and vehicle systems of interest by adding additional modules to the STREET framework. The CCM will determine which fuels and vehicle systems will be added.
- Prepare and submit a Power Point Presentation that includes the Final STREET Module Development Report.
- Present the PowerPoint at a workshop and participate in a discussion about the scope and direction of the work. Demonstrations shall be included as needed. The time, date, and location of the workshop will be determined by the CCM, but generally will take place at the Energy Commission.

Deliverables:

- Draft STREET Module Development Report
- Final STREET Module Development Report
- STREET Module Development Power Point Presentation

TASK 4 Develop Vehicle and Fuel Infrastructure Scenarios

The goals of this task are to develop realistic and spanning scenarios for potential combinations of alternative vehicles and fuels, and to use the expanded STREET to holistically assess greenhouse gas and pollutant emissions, resource usage, and air quality impacts. It is likely that multiple alternative vehicles and fuels will be commercially successful in the future and these scenarios predict the potential combinations and fleet mixes that are possible.

The Contractor shall:

- Develop the array of realistic and spanning vehicle and fuel infrastructure scenarios for analysis in consultation with the CCM. The strengths of both the Contractor's resources and the Energy Commission will be leveraged to generate highly detailed, future vehicle and fuel infrastructure scenarios that the Contractor will use as inputs to the STREET analysis tool.
 - Consult Energy Commission staff on scoping, scenarios, and infrastructure planning.
 - Utilize Energy Commission experience, in combination with an understanding of the STREET capability, to develop scenarios.
- Utilize STREET to determine greenhouse gas emissions, criteria pollutant emissions, energy consumption, and resource usage for future vehicle and fuel infrastructure scenarios.
 - Run at least one hundred fifty vehicle and fuel infrastructure scenarios using the Preferred Combination Assessment (PCA) component of STREET.
 - Run at least thirty air-quality case simulations for the SJV, SoCAB, and BAAB, based on the results of the PCA analyses, and as identified by the CCM.
- **Assess diesel toxic particulate matter emissions displacement and calculate public health air quality impacts.**
 - **Work with the CEC, after confirming the work is not already done by the National Renewable Energy Laboratory (NREL), to identify the spatial allocation of emission reductions from these emission reductions to adjust emission profiles in the Contractor's air quality model.**
 - **Simulate air quality for the emission reductions resulting from the current CEC investments.**
 - **Work with the CEC to identify spatial allocation of emission reductions from increased use of technologies invested by the CEC. The Contractor shall use these emission reductions to adjust emission profiles in the Contractor's air quality model.**
 - **Simulate air quality for the emission reductions resulting from emission reductions of increased use of technologies invested by the CEC.**
- Prepare and submit a detailed Scenario Development and Results Report based on the research performed in this task.
- Prepare and submit training materials for STREET to train Energy Commission staff and stakeholders. Training materials shall include but are not limited to, training manuals/binders, slideshows/presentations, interactive how-to-guides/step-by-step guides, screenshots, posters, and videos.
- Prepare and submit a Power Point Presentation that includes the Final Scenario Development and Results Report.
- Present the PowerPoint at a workshop and participate in a discussion about the scope and direction of the work. Demonstrations shall be included as needed. The time, date, and location of the workshop will be determined by the CCM, but generally will take place at the Energy Commission.

Deliverables:

- Draft Scenario Development and Results Report
- Final Scenario Development and Results Report
- Draft STREET Training Materials

- Final STREET Training Materials
- Scenario Development and Results Power Point Presentation

TASK 5 Perform Parametric Variations within STREET

The goal of this task is to parametrically vary vehicle and fueling infrastructure scenarios within STREET to determine preferred scenarios for reducing greenhouse gas and criteria pollutant emissions and for minimizing the use of non-renewable resources.

The Contractor shall:

- Use the expanded STREET to assess incremental changes in vehicle penetrations and infrastructure build-out, over time, to quantitatively assess greenhouse gas emissions, air quality, energy use, and resource consumption impacts.
 - Based on parametric analysis, the results will indicate preferred vehicle and fuel scenarios to achieve the best greenhouse gas and pollutant emission reductions.
- Meet with the CCM to identify specific high-resolution air quality simulations and scenarios. For each scenario that has been identified, run the STREET air quality simulation attribute that provides concomitant spatially- and temporally-resolved high-resolution air quality data.
- Prepare and submit a detailed Perform Parametric Variations Scenario Results Report of scenario results based on the research performed in this task.
- Prepare and submit a Power Point Presentation that includes the Final Perform Parametric Variations Scenario Results Report.
- Present the PowerPoint at a workshop and participate in a discussion about the scope and direction of the work. Demonstrations shall be included as needed. The time, date, and location of the workshop will be determined by the CCM, but generally will take place at the Energy Commission.

Deliverables:

- Draft Perform Parametric Variations Scenario Results Report
- Final Perform Parametric Variations Scenario Results Report
- Perform Parametric Variations Scenario Results Power Point Presentation

TASK 6 Develop Strategy for Web-Based STREET Model

The goal of this task is to develop a strategy for STREET to be used as a web-based tool in the future by Energy Commission staff and the general public. This site will be hosted and maintained on the Contractor's systems.

The Contractor shall:

- Develop a strategy for enabling the Energy Commission to utilize a web-based STREET model, with the potential to make it available to the general public.
- Prepare and submit a Web-Based STREET Model Interface Strategy Report presenting the strategy and documenting its development. This task shall be completed once the model has been fully vetted and tested by the Contractor and the CCM.
- Develop a user interface (screen mask system with input and output options for running scenarios on the STREET model) that is designed in a simple fashion so that no special skills are required for its use.

- Prepare and submit a Power Point Presentation that includes the Final Web-Based STREET Model Interface Strategy Report and web-based interface of the STREET model.
- Present the PowerPoint at a workshop and participate in a discussion about the scope and direction of the work. Demonstrations shall be included as needed. The time, date, and location of the workshop will be determined by the CCM, but generally will take place at the Energy Commission.

Deliverables:

- Draft Web-Based STREET Model Interface Strategy Report
- Final Web-Based STREET Model Interface Strategy Report
- Web-Based STREET Model Interface Strategy Power Point Presentation

TASK 7 Training and Input to the high resolution model

The goal of this task is to work with the Energy Commission staff to explain how to establish criteria for CEC staff so they can input and manipulate the high resolution model (Task 8), how the input relates to the model's output, and how the output is used to develop an infrastructure plan so the Energy Commission can develop its own infrastructure plans. The Contractor will work with the Energy Commission to show examples for fuel and vehicle technologies, including fuel cell vehicles/hydrogen, electric drive/electricity, ICE/ethanol, ICE/renewable diesel/biodiesel, ICE/natural gas, and ICE/propane.

At the end of the training, the Energy Commission staff will be able to use the web-based STREET model to evaluate all fuel types so that the Energy Commission staff can:

- Identify markets and impacts of future ARFVTP solicitations and infrastructure investments on those markets,
- Perform detailed optimization in areas of interest in particular regions throughout California (including synergistic scenarios comprised of various alternative fuel types),
- Identify optimum locations of connector and destination stations,
- Determine temporally evolving throughput requirements, and
- Create rollout plans specifying station priorities and throughput expansion.

The Contractor shall:

- Work with Energy Commission staff to identify geographic locations of existing markets and potential near- and mid-term markets for the fuel and vehicle technologies listed above in Task 3 using publicly available datasets with the STREET model.
 - If necessary, use proprietary industry data for verification purposes only.
 - If using proprietary or confidential industry data, identify for the Commission:
 - the source of the data;
 - the general type of data;
 - the arrangements under which the data was provided to UCI

and whether and how the integrity of the data is assured.

- Train Energy Commission staff on how a wide variety of criteria work with the STREET module (Task 8) so the Energy Commission staff can develop infrastructure plans.
- Train Energy Commission staff to identify the optimum number and locations of infrastructure investments to maximize infrastructure throughput in service of the highest number of customers and to evaluate environmental impacts.
- Train the Energy Commission staff using interactive, one-on-one, and classroom approaches and a power point presentation on the high resolution capability of STREET with the following data thereby Energy Commission staff will be able to view and manipulate the following data with the user-interface:
 - Existing fueling stations data
 - Combined alternative fueling station network data
 - Threshold coverage data for combined alternative fueling station networks
 - Existing network data of alternative fuels installations
 - Demand coverage data per station
 - Different scenario data of available funds
 - Different scenario data of vehicle deployment projects (analyzed in terms of daily and peak fueling capacities)
 - Zero emission vehicle (ZEV) mandate data
 - Rollout and scenario data of different fuel types
 - Varying population density data

Deliverables:

- Power Point presentation of high-resolution infrastructure capability of STREET

TASK 8 Develop and implement a Web-Based STREET Model User Interface

The goal of this task is to develop a web-based user-interface for the STREET model to be used by Energy Commission staff and members of the general public for three years. The user-interface is the user-friendly input/output “front-end” of the web-based tool. The user-interface will allow users to analyze an array of transportation fueling infrastructure scenarios and their impact on GHG and pollutant emissions, energy consumption, fueling infrastructure development and planning options, and other aspects.

The Contractor shall:

- Implement the strategy developed in TASK 6 for enabling the Energy Commission to utilize a web-based STREET model.
- Build the user interface (screen mask system with input and output options for running scenarios on the STREET model) that was designed in TASK 6 and develop the web-based STREET model for Energy Commission staff use. The interface is the user-friendly input/output “front-end” of the web-based tool. The final web-based STREET model user interface shall:

- Allow the Commission to analyze infrastructure demand and environmental impacts of various infrastructure scenarios for each alternative fuel as needed. The CCM shall identify the alternative fuels and their order of priority in writing.
- Include high-resolution capability and all necessary variables needed for each alternative fuel module and scenarios as identified below. The variables generally include physical constraints, emissions factors, and geographic information. However, the necessary variables may vary depending on the alternative fuel type. The contractor and the Commission's fuel lead will identify and agree on the necessary variables for each fuel module.
 - Include the expected air emissions reduction from oxides of sulphur, carbon monoxide, oxides of nitrogen, and particular matter.
 - Include the estimated gallons of gasoline and/or diesel fuel displaced by any alternative fuel (with associated mileage information) by classification of vehicles by types and the estimated use or duty cycle of the same alternative fuel.
 - Include a quantified estimate of the carbon intensity values for well-to-wheel analysis.
 - In the case of electric drive: Include varying response times, micro grid impacts, grid-level storage infrastructure, renewable resources, demand response, and distributed generation.
 - In the case of biomethane fuel: Include strategic opportunities to increase penetration and usage.
- Submit the draft web-based STREET model user interface (beta version) to the Energy Commission staff to test for functionality and usability. This will provide the opportunity for Energy Commission staff to use the tool in draft form and iterate with the contractor on changes and improvements before a finished product is finalized.
- Implement changes and improvements requested by the CCM and prepare final web-based STREET model user interface.
- Install and test the user interface at the Energy Commission without any modifications to the Energy Commission's network and software. Validate the system using recent historical results. (Programming is required of the contractor, but will not be required of the user e.g., Energy Commission staff and the public).
- Develop a user manual for Energy Commission staff so the Energy Commission staff can operate STREET independently of the Contractor,
- Train Energy Commission staff: Present the model's operation with demonstrations at the Energy Commission with scenarios, a user manual, and a power point presentation.
- Retain the web-based STREET model and user-interface on UCI's server for two years beyond the end of the Agreement. This duty is a surviving provision of this Agreement.

Deliverables:

- Draft web-based STREET model user interface (beta version)
- Final web-based STREET model user interface

- Web-based STREET model user interface strategy demonstration Power Point presentation
- User manual

TASK 9 Hydrogen Refueling Station Location Planning and Evaluation

The goal of this task is for the Contractor to assist the Energy Commission staff in the planning and evaluation of the location of hydrogen refueling stations, mainly with the STREET tool. The Contractor will use its established method to develop Station Location Areas (SLA's), or equivalent, to identify the placement of hydrogen refueling stations. The Contractor will use various publicly available data sets, or other datasets, to produce the SLA's and to interpret the SLA's to Energy Commission staff. Potentially, data sets such as those provided by commercial organizations could be used. The user-interface of STREET will enable the Energy Commission staff to view the location and details of California's existing and planned hydrogen refueling stations, along with the SLA's. The Contractor will also input and display data submitted by the Energy Commission staff in STREET.

[A CPR will be held during this Task]

The Contractor shall:

- **Develop SLA's, or equivalent, optimized for the placement of hydrogen refueling stations based on publicly available datasets, or other datasets, to promote the build out of the hydrogen refueling infrastructure in the state.**
- **Program the user-interface of STREET to display the location and details of California's existing and planned hydrogen refueling stations.**
- **Provide the capability to overlay existing and planned hydrogen refueling stations with the SLA's.**
- **Input and display data submitted by the Energy Commission staff in STREET.**
- **Prepare and submit written notification to the CCM of updates or changes made to STREET in regards to SLA's, existing or planned hydrogen refueling stations, or other data that would be pertinent to the Energy Commission's uses.**
- **Respond to Energy Commission Grant applicants who request an assessment of the location of a proposed hydrogen station in terms of being inside, outside, or near an SLA.**

Deliverables:

- **Updates to the STREET tool as designated by the CCM with new SLA's, planned hydrogen refueling stations, or other data as designated by the Energy Commission**
- **Written notification of updates or changes made to STREET**
- **Correspondence to Energy Commission grant applicants regarding an assessment of the location of a proposed hydrogen station in terms of being inside, outside, or near an SLA**

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, IRVINE

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

RESOLVED, that the Energy Commission approves Amendment 2 to Agreement 600-10-002 with **The Regents of the University of California on behalf of the Irvine campus** to extend the term of the contract for 3 years, revise the scope of work, and augment the budget by **\$360,000**. This amendment will provide continued technical support to the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) in planning and evaluating the early network of hydrogen refueling stations, other alternative fuels refueling infrastructure, and also develop additional air quality impact analyses; 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 10, 2014.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Harriet Kallemeyn,
Secretariat