STATE OF CALIFORNIA

CONTRACT REQUEST FORM (CRF)

CEC-94 (Revised 01/13) CALIFORNIA ENERGY COMMISSION

A) New Agreement 400-12-003 (To be completed by CGL Office)

B) Division	**Agreement Manager:**	**MS-**	**Phone**
400 Efficiency Renewable Energy Division	Samuel Lerman	26	916-651-3705

C) Contractor's Legal Name	**Federal ID Number**
Architectural Energy Corporation	84-0876062

D) Title of Project

Nonresidential Building Science Technical Support

E) Term and Amount	**Start Date**	**End Date**	**Amount**
	06 / 30 / 2013	03 / 31 / 2016	$ 3,993,879

F) Business Meeting Information

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

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

Proposed Business Meeting Date	06 / 12 / 2013	☐ Consent	☒ Discussion
Business Meeting Presenter	Samuel Lerman	Time Needed:	5 minutes

Please select one list serve. Efficiency

Agenda Item Subject and Description

Possible approval of Agreement [insert #] with Architectural Energy Corporation for a $3,993,879 contract to provide technical assistance for the development of the 2016 Nonresidential Building Energy Efficiency Standards (Standards), develop compliance tools for the 2013 & 2016 Nonresidential Standards, and develop and implement the nonresidential portions of the Comprehensive Energy Efficiency Program for Existing Buildings (AB 758).

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 contract mostly involves engineering analysis and software development.
2. If Agreement is considered a "Project" under CEQA:
   ☐ a) Agreement **IS** exempt. (Attach draft NOE)
   ☐ Statutory Exemption. List PRC and/or CCR section number: _____
   ☐ Categorical Exemption. List CCR section number: _____
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   _____
   ☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
   Check all that apply
   ☐ Initial Study ☐ Environmental Impact Report
   ☐ Negative Declaration ☐ Statement of Overriding Considerations
   ☐ Mitigated Negative Declaration

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

Legal Company Name:	Budget	SB	MB	DVBE
See attachment 1 for subcontractor list.	$	☒	☐	☐
	$	☐	☐	☐
	$	☐	☐	☐

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

Legal Company Name:

STATE OF CALIFORNIA
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J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
State - ERPA	2012-2013	400.001	$868,879
State - ERPA	2013-2014	400.001	$1,000,000
State - ERPA	2013-2014	400.003	$250,000
State - ERPA	2014-2015	400.001	$1,000,000
State - ERPA	2014-2015	400.003	$250,000
R&D Program Area: Energy Efficiency		TOTAL:	$3,368,879
Explanation for "Other" selection	See attachment 2 for full listing		
Reimbursement Contract #:		Federal Agreement #:	

K) Contractor's Administrator/ Officer				**Contractor's Project Manager**			
Name:				Name:	Dimitri Contoyannis		
Address:				Address:	160 Pine, Suite 700		
City, State, Zip:				City, State, Zip:	San Francisco, CA, 94111		
Phone:	- -	Fax:	- -	Phone:	415-970-6521	Fax:	- -
E-Mail:				E-Mail:	dcontoyannis@archenergy.com		

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

☒ Solicitation RFQ Solicitation #: RFQ-12-401 # of Bids: 1 Low Bid? ☐ No ☐ Yes
☐ Non Competitive Bid *(Attach CEC 96)*
☐ Exempt Select Exemption (see instructions)

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:

This architectural and engineering professional services technical support contract will provide the Energy Commission access to nonresidential building energy science experts that are not available within state service. The Contractor will work under the direction of the Energy Commission to complete engineering and econometric analyses as well as software tool development.

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

Comparisons with other approved contractors have been completed and the costs are comparable.

S) Disabled Veteran Business Enterprise Program (DVBE)

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

T) Miscellaneous Agreement Information

1. Will there be Work Authorizations?	☐ No	☒ Yes
2. Is the Contractor providing confidential information?	☒ No	☐ Yes
3. Is the contractor going to purchase equipment?	☒ No	☐ Yes
4. Check frequency of progress reports		
☒ Monthly ☐ Quarterly ☐ Other...		
5. Will a final report be required?	☐ No	☒ Yes
6. Is the Agreement, with amendments, longer than a year? If yes, why?	☐ No	☒ Yes

A multi-year contract is necessary to complete the software development, testing and deployment.

U) The following items should be attached to this CRF (as applicable)

1. Exhibit A, Scope of Work	☐ N/A	☒ Attached
2. Exhibit B, Budget Detail	☐ N/A	☐ Attached
3. CEC 96, NCB Request	☐ N/A	☐ Attached
4. CEC 30, Survey of Prior Work	☐ N/A	☐ Attached
5. CEC 95, DVBE Exemption Request	☐ N/A	☐ Attached
6. CEQA Documentation	☐ N/A	☐ Attached
7. Resumes	☐ N/A	☐ Attached
8. CEC 105, Questionnaire for Identifying Conflicts		☒ Attached

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date

H. List all subcontractors (major and minor) and equipment vendors

Legal Business Name	Budget	SB	MB	DVBE
Taylor Engineering	N/A	☒	☐	☐
Benya Lighting	N/A	☐	☐	☐
Wrightsoft	N/A	☐	☐	☐
Hitchcock Consulting	N/A	☐	☐	☐
Hicks Consulting	N/A	☒	☐	☒
L'Monte Info.Services	N/A	☒	☐	☐
GARD Analytics	N/A	☐	☐	☐
360 Analytics	N/A	☐	☐	☐
Calthorpe Associates	N/A	☐	☐	☐
New Buildings Institute	N/A	☐	☐	☐
PECI	N/A	☐	☐	☐
Vacom	N/A	☐	☐	☐
E3	N/A	☒	☐	☐
NREL	N/A	☐	☐	☐
Rasent	N/A	☐	☐	☐

J) **Budget Information**

SEP	2012-2013	400.003	$125,000
ERPA	2012-2013	100.152	$500,000
ERPA	2012-2013	400.001	$868,879
ERPA	2013-2014	400.001	$1,000,000
ERPA	2013-2014	400.003	$250,000
ERPA	2014-2015	400.001	$1,000,000
ERPA	2014-2015	400.003	$250,000

TOTAL: $3,993,879

EXHIBIT A

SCOPE OF WORK

PURPOSE

The purpose of this agreement is to contract with a team of consultants for technical support for:

- Revising the 2013 California Building Efficiency Standards for 2016 for nonresidential buildings
- Developing Compliance Tools for 2013 & 2016 for nonresidential building Standards
- Developing and Implementing the nonresidential portions of the Comprehensive Energy Efficiency Program for Existing Buildings (AB 758)

ACRONYMS/GLOSSARY

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

ACRONYMS & TERMS	***DEFINITION***
AB 758	California Assembly Bill 758, stats. 2009, ch. 470
Action Plan	California Comprehensive Building Energy Efficiency Action Plan, expected release June 2013
ARRA	American Reinvestment and Recovery Act of 2009
ASHRAE	American Society of Heating, Refrigeration and Air-conditioning Engineers
BEARS	Building Energy Asset Rating System
2013 CBECC-Com	California Building Energy Code Compliance software for high-rise residential and nonresidential buildings
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPUC	California Public Utilities Commission
CO2e	Carbon Dioxide equivalent
Energy Commission	California Energy Commission
EUI	Energy Use Index, reported in units of kBtu per square feet
HVAC	Heating, Ventilating, and Air Conditioning
IEPR	Integrated Energy Policy Report
PIER	Public Interest Energy Research program at the Energy Commission
Scoping Report	California Comprehensive Building Energy Efficiency Scoping Report
SEP	State Energy Program, US Department of Energy
State	State of California

WORK AUTHORIZATIONS

The Agreement that results from this solicitation shall be conducted as a "work authorization" Agreement. No work shall be undertaken unless authorized by the CAM through a specific written document called a "work authorization".

The CAM will prepare and issue the written work authorizations and shall set a maximum price, budget, and schedule for the work to be performed. The CAM will work, in consultation with the Contractor, to assign work to either the Contractor or a subcontractor.

NO WORK GUARANTEE

The Energy Commission does not guarantee any minimum or maximum amount of work to the prime Contractor or any Subcontractor under the Agreement.

WORKSHOPS & HEARINGS

All workshops and hearings are sponsored, organized, and facilitated by the Energy Commission. The Energy Commission is responsible for any costs associated with a workshop or hearing. Contractor will provide labor only.

INCIDENTAL SERVICES

Contractor shall provide incidental services to support the Building Standards and AB 758 technical tasks in the general topic areas listed below. Technical Task 3-16 provide more detailed task activities for these areas:

- Economic & Financial Analysis specifically for AB 758 and Building Standards Work
- Graphic Design/Document Support for reports and other deliverables
- Public Outreach & Communication/ Marketing/ Public Relations/ Program Development necessary to complete the goals of this agreement

SOFTWARE USE & DEVELOPMENT

All software developed under this contract will be subject to open source licensing requirements, as described in Exhibit D, paragraph 8, unless the Energy Commission directs different ownership and licensing requirements in a work authorization. No pre-existing proprietary software will need to be modified in order to perform the tasks outlined in this Agreement. The Energy Commission owns or has open source license access to any software that the Contractor will modify under the terms of this Agreement.

FORMAT/REPORTING REQUIREMENTS

Deliverables/Reports

When creating reports, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager (CAM), the latest version of the Consultant Reports Style Manual published on the Energy Commission's website:

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

Each final deliverable shall be delivered as one original, reproducible, 8 ½" by 11", camera-ready master in black ink. Illustrations and graphs shall be sized to fit an 8 ½" by 11" page and readable if printed in black and white.

Electronic File Format

The Contractor shall deliver an electronic copy (CD ROM or memory stick or as otherwise specified by the CAM) of the full text in a compatible version of Microsoft Word (.doc).

The following describes the accepted formats of electronic data and documents provided to the Energy Commission as contract deliverables and establishes the computer platforms, operating systems and software versions that will be required to review and approve all software deliverables.

- Data sets shall be in Microsoft (MS) Access or MS Excel file format.
- PC-based text documents shall be in MS Word file format.
- Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
- Project management documents shall be in MS Project file format.

Software Application Development

If this scope of work includes any software application development, including but not limited to databases, websites, models, or modeling tools, contractor shall utilize the following standard Application Architecture components in compatible versions as specified in a work authorization.

- 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 Software Application Development requirements above must be approved in writing by the Energy Commission Information Technology Services Branch.

PRIMARY TASKS

The major categories of work are divided into the following tasks:

TASK #	*DESCRIPTION OF TASK*
1	Agreement Management
BUILDING STANDARDS TECHNICAL SUPPORT (Tasks 2-7)	
2	Time Dependent Valuation of Energy Methodology for the 2016 Nonresidential Building Energy Efficiency Standards
3	Life Cycle Cost (LCC) Methodology for the 2016 Nonresidential Building Energy Efficiency Standards
4	2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software
5	Review ASHRAE Nonresidential Ventilation Standards
6	Nonresidential Compliance Software Deployment
7	Develop Data Exchange Infrastructure for Nonresidential Standards Data Registries
AB 758 TECHNICAL SUPPORT (Tasks 8-11)	
8	Action Plan Support for Existing Buildings
9	Nonresidential Ratings and Disclosure Programs for Existing Buildings
10	Nonresidential Efficiency Improvement Programs for Existing Buildings
11	Nonresidential Building Energy Performance Database for Existing Buildings
CONTINGENCIES	
12	Contingencies and Additional Topic Areas for Building Standards Technical Support
13	Contingencies and Additional Topic Areas for AB 758 Technical Support

TASKS 1 – 13

TASK 1 – AGREEMENT MANAGEMENT

Each Work Authorization will reflect the maximum that can be spent for Agreement Management for each fiscal year and each funding source.

The Contractor's responsibilities under this task include, but are not limited to the following:

Task 1.1 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 CAM, the Contracts Agreement Officer, and a representative of the Accounting Office. The meeting will be held in Sacramento, CA and the CAM will designate the specific location. The Contractor shall include their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the CAM in this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting.
- If necessary, prepare an updated Schedule of Deliverables based on the decisions made in the kick-off meeting.

The CAM shall:

- Arrange the meeting including scheduling the date and time.
- Provide an agenda to all potential meeting participants prior to the kick-off meeting.

Deliverables:

- An Updated Schedule of Deliverables (if applicable)

Task 1.2 Program Meetings and Briefings

The Contractor and subcontractor shall:

- At the request of the Energy Commission's CAM, be available for meetings or to provide written or verbal program briefings to the Energy Commission's staff or others. The cost of meetings with local governments and public institutions will be included in each Work Authorization. The cost of meetings requested specifically by the Contractor shall be borne solely by the Contractor. The Energy Commission expects to hold no more than one (1) program briefing meeting per quarter.

Task 1.3 Invoices

The Contractor shall:

- Prepare invoices for all reimbursable expenses incurred performing work under this Agreement in compliance with the Exhibit B of the Terms and Conditions of the Agreement. Invoices shall be submitted with the same frequency as progress reports (task 1.4). Invoices must be submitted to the Energy Commission's Accounting Office.

Deliverables:

- Invoices

Task 1.4 Manage Subcontractors:

The goal of this task is to ensure quality products, to enforce subcontractor Agreement provisions, and in the event of failure of the subcontractor to satisfactorily perform services, recommend solution to resolve the problem.

The Contractor shall:

- Manage and coordinate subcontractor activities. The Contractor is responsible for the quality of all subcontractor work and the Energy Commission will assign all work to the Contractor. If the Contractor decides to add new subcontractors, they shall 1) comply with the Terms and Conditions of the Agreement, and 2) notify the CAM who will follow the Energy Commission's process for adding or replacing subcontractors.

Task 1.5 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 progress reports which summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due within 15 calendar days after the end of the reporting period. The CAM will provide the format for the progress reports.

Deliverables:

- Monthly Progress Reports

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 completed under this Agreement. The Final Report shall be prepared in language easily understood by the public or layperson with a limited technical background.

The Final Report must be completed before the termination date of the Agreement in accordance with the Schedule of Deliverables.

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

Task 1.6.1 Final Report Outline

The Contractor shall:

- Prepare and submit a draft outline of the Final Report for review and approval. The CAM will provide written comments to the Contractor on the draft outline. The Contractor shall review the comments and discuss any issues with the recommended changes with the CAM.
- Prepare and submit the final outline of the Final Report, incorporating CAM comments.

Deliverables:

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

Task 1.6.2 Final Report

The Contractor shall:

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report for review and comment. The CAM will provide written comments to the Contractor. The Contractor shall review the comments and discuss any issues with the recommended changes with the CAM.
- Prepare and submit the Final Report, incorporating CAM comments.

Deliverables:

- Draft Final Report
- Final Report

Task 1.7 Final Meeting

The goal of this task is to discuss closeout of this Agreement and review the project.

The Contractor shall:

- Meet with Energy Commission staff prior to the term end date of this Agreement. The meeting will be held in Sacramento, CA and the CAM will designate the specific location. This meeting will be attended by the Contractor Project Manager and the CAM. The CAM will determine any additional appropriate meeting participants. The administrative and technical aspects of Agreement closeout will be discussed at the meeting.

- Present findings, conclusions, and recommended next steps (if any) for the Agreement, based on the information included in the Final Report.

- Prepare a written document of meeting agreements and unresolved activities.

- Prepare a schedule for completing the closeout activities for this Agreement, based on determinations made within the meeting.

Deliverables:

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

Title-24, Part 6 Nonresidential Building Energy Efficiency Standards (Standards) Technical Support

2016 Nonresidential Building Energy Efficiency Standards Development Support

TASK 2– TIME DEPENDENT VALUATION OF ENERGY METHODOLOGY FOR THE 2016 NONRESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS AND UPDATE OF THE PV COST EFFECTIVENESS STUDY

One goal of this task is to update the methodology used for the 2013 Nonresidential Standards to value the electricity, natural gas and propane energy savings that will be sought in the 2016 Nonresidential Standards update. Another goal of this task is to prepare a study on the cost-effectiveness of photovoltaic systems . This task will also develop a new method to value the cost of water used in buildings and the potential savings from water efficiency measures installed in buildings. The work in this task is expected to include, but not be limited to, the following:

- Review and revise the 2013 Time Dependent Valuation of Energy methodology, with the following considerations:

    - Separate energy valuations for each distinctly different electricity service area in the state (e.g. a Publicly Owned Utility may have an electricity load shape and cost structure that is not adequately represented by the average Investor Owned Utility electricity load shape and cost structure)
    - Current and projected costs of fuels and electricity based on state and national energy policies, including the potential cost impacts of high concentrations of renewable energy generation in California
    - Current and projected retail rate structures, including an analysis of what portion of these retail energy costs should be considered fixed versus volumetric (i.e. dependent on the amount of energy used)
    - Current and projected costs of carbon and other environmental impacts of energy use
- Develop a methodology to value the building-related water savings that will be considered in the 2016 Nonresidential Standards update
- Update the PV Cost-Effectiveness Study, with the following considerations:
    - Current and projected costs of PV systems installed on residential and nonresidential buildings
    - 2016 Standards Time Dependent Valuation of Energy
    - Federal tax incentives for PV installations
    - Tax benefits of long-term lease agreements for PV systems

Deliverables:

- 2016 Standards - Time Dependent Valuation of Energy Report
- 2016 Standards - Valuation of Water Methodology Report
- 2016 Standards – PV Cost-Effectiveness Study
- Other deliverables to be defined as needed through work authorizations

TASK 3 – LIFE CYCLE COST (LCC) METHODOLOGY FOR THE 2016 NONRESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

The goal of this task is to update the methodology used for the 2013 Nonresidential Standards to assess the building life-cycle costs and savings for the energy efficiency measures to be considered in the 2016 Nonresidential Standards Update. The work in this task is expected to include, but not be limited to, the following:

- Review and revise the 2013 LCC methodology, with the following considerations:
    - Revisit assumption of building life, considering what is used in other states, nations and regions (e.g. the European Union uses 50-60 years for policy assumptions of building useful life, while the Energy Commission uses 30 years)
    - Review and revise the discount rate applied to energy cost savings over time, considering what is used in other states, nations and regions (e.g. the Massachusetts Department of Energy Resources uses 1%, while the Energy Commission uses 3%)

- Establish cost reduction curves for different classes of technology predicting reductions in costs due to adoption of mandatory efficiency measures. Analyze and incorporate measures as appropriate to leverage all applicable work on this topic completed by U.S. DOE for the federal appliance efficiency standards
- The Contractor shall identify, develop and implement a methodology for completing life cycle cost analyses to determine the cost effectiveness of measures for inclusion in the 2016 Nonresidential Standards. The methodology will build on the Life Cycle Cost Methodology[1] done for the 2013 Nonresidential Standards. The methodology will evaluate the cost effectiveness of measures both incrementally and in combination as specified by the CAM. The methodology will document all economic assumptions, periods of analysis, and energy (e.g., electricity, natural gas, and propane) forecasts that are to be used. The methodology will also identify any sensitivity or scenario analyses on these and other parameters (e.g., measure performance, measure costs, useful lives, fuel costs, avoided costs of climate change, water costs, and emissions values)

Deliverables:

- 2016 Life Cycle Cost Analysis Report reflecting the above tasks
- Other deliverables to be defined as needed through work authorizations

TASK 4 – 2016 NONRESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS DEVELOPMENT ANALYSIS SOFTWARE

The goal of this task is to update *CBECC-Com* to assist in developing the 2016 Standards and add additional user interfaces as necessary to translate building energy performance data and energy related building operational characteristics into software that applies the performance standards requirements under consideration for the 2016 Standards to nonresidential building designs, calculating annual energy budgets and providing comparative results. The work in this task is expected to include but not be limited to the following:

- Develop or obtain for use a parametric run generator that allows multiple *CBECC-Com* analyses to be launched and results summarized
- Develop a method of creating automatic modifications of rulesets used in *CBECC-Com* for use in parametric analyses
- Add modeling capabilities and compliance modeling rules for commercial refrigeration to *CBECC-Com*
- Model building design scenarios appropriate for zero net energy buildings to include at least the following systems:
    - Photovoltaic and fuel cell systems
    - Solar thermal systems
    - Advanced HVAC and water heating systems
    - Advanced envelope modeling, including daylight modeling

[1] http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/general_cec_documents/2011-01-14_LCC_Methodology_2013.pdf

- Modify the 2013*CBECC-Com* software as needed to work with a parametric run generator and to model new efficiency technologies that need to be evaluated for the 2016 Nonresidential Building Energy Efficiency Standards update
- Prepare documentation that explains all significant modifications made to the Standards Data Dictionary, the Standards compliance ruleset and the CBECC-Com application software.

Deliverables:

- 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Functional Requirements
- 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Specifications
- 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software
- 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Documentation
- Other deliverables to be defined as needed through work authorizations

TASK 5 – REVIEW ASHRAE NONRESIDENTIAL VENTILATION STANDARDS

The goal of this task is to review the current ASHRAE 62.1 Ventilation Standards and make recommendations on whether or not the Energy Commission should adopt ASHRAE 62.1 in the 2016 Nonresidential Building Energy Efficiency Standards. The work in this task is expected to include, but not be limited to, the following:

- Review the ASHRAE 62.1 Standards that are not included in the 2013 Standards
- Validate that the control technologies included in the ASHRAE 62.1 Standards are both technologically feasible and cost-effective
- Develop and provide technological recommendations to the Energy Commission on what components of the ASHRAE 62.1 Standards should be included in the 2016 Standards update
- Attend pre-rulemaking and rulemaking workshops to support Energy Commission staff as necessary to consider the inclusion of ASHRAE 62.1 ventilation standards in the 2016 Standards update
- Develop additional software modeling rules that need to be added to the 2013 *CBECC-Com* to model the energy impacts of the ventilation technologies that are recommended to the Energy Commission

Deliverables:

- Recommendations for adopting ASHRAE 62.1 Ventilation Standards
- *2013 CBECC-Com* ventilation software modeling algorithms and rules
- Other deliverables to be defined as needed through work authorizations

2013 Nonresidential Standards Implementation Support

TASK 6 – NONRESIDENTIAL COMPLIANCE SOFTWARE DEPLOYMENT

The goal of this task is to support the Energy Commission's deployment of the California Building Energy Code Compliance (*CBECC)-Com* 2013 Standards compliance software. The work in this task is expected to include, but not be limited to, the following:

- Identify, update and track software bugs identified through project team and stakeholder reviews of the compliance software
- Complete the Envelope Trade-off Approach (specified in the 2013 Standards)which is a simplified compliance software ruleset specifically for roof replacement building projects
- Pilot new versions of the 2013 *CBECC-Com* with building industry stakeholders
- Provide technical support to third-party software vendors for their integration of the 2013 *CBECC-Com* Application Programming Interface (API) into third-party software tools
    - Document all updates to the compliance software data model and rulesets
    - Develop solutions to vendor issues as directed
- Establish a public website and host the 2013 *CBECC-Com* open source software project. Include a software bug reporting mechanism on this public website
- Establish procedures for the Energy Commission to assume responsibility for this public website at the conclusion of the Agreement.

Deliverables:

- Updated versions of the 2013 *CBECC-Com* software, including updates to software documentation
- *CBECC-Com* ruleset for the Envelope Trade-off Approach
- Software bug tracking mechanism
- Compliance software source code posted to open source on-line software repository
- Other deliverables to be defined as needed through work authorizations

TASK 7 – DEVELOP DATA EXCHANGE INFRASTRUCTURE FOR NONRESIDENTIAL STANDARDS DATA REGISTRIES

The first goal of this task is to assist the Energy Commission in the development of the data exchange protocols and data dictionary for the 2013 Standards Update that together provide the necessary infrastructure on which private parties develop Nonresidential Standards Data Registries. The second goal of this task is to provide technical support for the development of the Energy Commission's Standards Data Repository. The work in this task will include reviewing Standards compliance documentation, the current Standards Data Dictionary used in the 2013 Nonresidential Compliance Software, and existing data exchange schema used to communicate Standards-related building energy performance. The work in this task is expected to include, but not be limited to, the following:

- Develop data dictionary and data exchange protocols
- Develop the nonresidential compliance document xml template infrastructure that is specified in the 2013 Standards

- Pilot data exchange to and from registries. This activity will require working with potential nonresidential compliance data registry providers to demonstrate the functionality of the data dictionary and data exchange protocols developed in this task
- Develop functional requirements for the Standards Data Repository
- Develop database and user interface specifications for the Standards Data Repository

Deliverables:

- Nonresidential Standards Compliance Data Dictionary
- Nonresidential Standards Compliance Data Exchange Protocols
- Data Exchange Pilots with Standards Data Registries
- Standards Data Repository Functional Requirements
- Standards Data Repository Database and User Interface Specifications
- Other deliverables to be defined as needed through work authorizations

AB 758 Technical Support

TASK 8 – ACTION PLAN SUPPORT FOR EXISTING BUILDINGS

The goal of this task is to support Energy Commission staff by providing strategic guidance and expertise for the nonresidential portions of the Comprehensive Energy Efficiency Program for Existing Buildings Action Plan (Action Plan)[2], and make recommended modifications to the plan at the direction of the Energy Commission. The work in this task is expected to include but not be limited to the following:

- Assist Energy Commission staff in developing Revisions to the Action Plan

Deliverables:

- Proposed revisions to the nonresidential portions of the Action Plan
- Other deliverables to be defined as needed through work authorizations

TASK 9 – NONRESIDENTIAL RATING AND DISCLOSURE PROGRAMS FOR EXISTING BUILDINGS

The goal of this task is to support the Energy Commission in the development of voluntary nonresidential rating and disclosure program guidelines. The work in this task is expected to include but not be limited to the following:

- Review and modify as necessary the rating metric and performance baselines established for BEARS
    - Consider a rating metric that has miles per gallon-type units, such as kBtu per sq. ft., and options to include a comparison of the rated buildings to code expectations in the derivation of the performance ratings
    - Use focus groups to judge the communication power and market acceptance of alternatives

[2] Expected to be released by the Energy Commission in June 2013

- Consider options as allowed by law to provide the energy performance valuation markets in California with a tiered approach to rating nonresidential buildings, where preliminary ratings can be generated that are less expensive and less time consuming to complete than more detailed performance ratings that require field investigations and certified raters. These preliminary ratings would not replace the more rigorous rating approaches, but instead provide a building energy performance rating path that begins with a preliminary evaluation using appropriate vintage, location and building type defaults followed up with more building specific ratings that are needed for market events such as real estate appraisals and assessments of efficiency improvement opportunities.
- Update rating calculation methodologies and **develop** implementation software
    - Develop a rating approach that uses the energy use performance baselines and scenarios in the nonresidential building energy performance maps (see Task 7) to calculate the relative energy performance ratings of California buildings
    - Develop performance rating rulesets using the open source rule-based modeling software tools being used for the implementation of the 2013 Building Energy Efficiency Standards
    - Consider options to use U.S. DOE's Asset Rating tool's Application Programming Interface to develop relative performance rating software for BEARS
- Provide technical assistance on BEARS topics and software to the Energy Commission if necessary for piloting revised BEARS in California public and private buildings
- Provide technical assistance to the Commission to complete tasks identified in the Scoping Report[3] and Action Plan related to BEARS
- Develop specifications for training and certification requirements for Energy Assessors
- Provide technical support for the rulemaking proceedings conducted by the Energy Commission to adopt mandatory nonresidential rating and disclosure regulations
- Research and recommend strategies to increase building industry awareness of nonresidential energy performance ratings and disclosures
- Use technical knowledge and expertise to develop training curricula for Energy Assessors to implement BEARS programs
- Research options for rating disclosures at time-of-sale or other appropriate trigger points, or date certain rating disclosures, that do not adversely impact the real estate transaction schedule

Deliverables:

- Draft and Final Voluntary nonresidential rating and disclosure program technical guidelines
- Recommendations for building industry awareness of nonresidential energy performance ratings and disclosures
- BEARS training curricula for Energy Assessors

[3] Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report, August 2012, CEC-400-2012-015

- Other deliverables to be defined as needed through Work Authorizations

TASK 10 – NONRESIDENTIAL EFFICIENCY IMPROVEMENT PROGRAMS FOR EXISTING BUILDINGS

The goal of this task is to provide support to the Energy Commission in its support of existing and potential nonresidential building energy performance upgrade programs. The work in this task is expected to include, but not be limited to, the following:

- Develop technical guidelines for implementing voluntary nonresidential building energy performance upgrade programs such as time of sale improvements
- Work with Energy Commission staff to identify available financing opportunities for nonresidential building owners within the state and publicize information regarding program territory, eligibility requirements, terms of loans, and other information about financing requirements and availability

Deliverables:

- Draft and Final Voluntary nonresidential building energy performance upgrade programs technical guidelines
- Other deliverables to be defined as needed through work authorizations
- Other deliverables to be defined as needed through work authorizations

TASK 11 – NONRESIDENTIAL BUILDING ENERGY PERFORMANCE DATABASE (NBEPD) FOR EXISTING BUILDINGS

The goal of this task is to design, create and populate the Nonresidential Building Energy Performance Database (NBEPD) that contains estimates of energy use for large samples of existing nonresidential buildings. This database may also contain measured energy use data if it is available. This task also includes developing analysis, visualization and reporting applications for the data within this database. The work in this task is expected to include but not be limited to the following:

- Leverage the information technology infrastructure developed by the U.S. Department of Energy (DOE) for the Building Performance Database, DenCity (DOE's Energy City) and SEED (Standard Energy Efficiency Data platform)
- Use the public domain 2013 nonresidential building energy modeling software, EnergyPlus, to model samples of California existing nonresidential buildings
    - Build model prototypes for EnergyPlus using the nonresidential building types established in Urban Footprint
    - Model these nonresidential building prototypes in all 16 Title 24, Part 6 climate zones to establish existing nonresidential building baselines for every geographic region of California
    - Model policy scenarios for each building prototype in each climate zone
- Using a software program(s) as directed by the CAM, create a database of building energy models and resulting estimates of hourly, monthly and annual energy use

statistics for all nonresidential buildings modeled, using any existing database architecture for modeled data such as DenCity

- Build probability distributions for each performance metric extracted from the database
- Use energy use distributions to calculate relative performance ratings (see Task 9)
- Build applications to analyze and present visual representations of nonresidential building performance
    - Leverage Urban Footprint open source software designed for California land use planning to present visual representations of energy efficiency scenarios on California and regional Geographic Information System (GIS) maps
- Develop database analysis, visualization, and reporting applications to provide the following types of information to the public:
    - Energy performance ratings and benchmarks
    - Expected energy savings and probability distributions by measure or program type or climate zone or market segment
- Develop database analysis, visualization, and reporting applications to provide information to state, regional, and local policy makers regarding:
    - Potential for energy and Green House Gas (GHG) reductions by market segment, building sector, climate zone, or region

Deliverables:

- Populated Nonresidential Building Energy Performance Database (NBEPD)
- Urban Footprint Data Sets for Nonresidential Building Energy Baseline and Policy Scenarios
- Nonresidential Performance Rating Methodology using the NBEPD
- Database analysis, visualization and reporting applications specific to nonresidential building energy efficiency decision support
- Other deliverables to be defined as needed through work authorizations

TASK 12 – CONTINGENCIES AND ADDITIONAL TOPIC AREAS FOR BUILDING STANDARDS TECHNICAL SUPPORT

The Contractor shall assist with work to develop program components beyond what is specifically described in Tasks 1 and Tasks 2-7. The work in this task is expected to include but not be limited to the following:

- Providing technical expertise to conduct unexpected research and analysis needed to develop program components as they arise throughout the agreement period.
- Attending Workshops and Hearings that support the 2016 Standards update.

Deliverables:

- To be defined as needed through work authorizations

TASK 13 – CONTINGENCIES AND ADDITIONAL TOPIC AREAS FOR AB 758 TECHNICAL SUPPORT

The Contractor shall assist with work to develop program components beyond what is specifically described in Tasks 1 and Tasks 8-11. The work in this task is expected to include but not be limited to the following:

- Providing technical expertise to conduct unexpected research and analysis needed to develop program components as they arise throughout the agreement period.
- Provide technical support to aid the Energy Commission's implementation of the Action Plan for areas not covered in other specific technical support tasks.
- Attending Workshops and Hearings that support AB 758 programs.

Deliverables:

- To be defined as needed through Work Authorizations

DELIVERABLES

The following deliverables chart does not represent all deliverables necessary to complete the goals and objectives of this agreement. Additional deliverables will be outlined in work authorizations. For deliverables listed, work authorizations will specify exact due dates.

TASK #	***DELIVERABLES***	***TENTATIVE DUE DATES***
1.1		
	• Updated schedule of deliverables (if applicable)	3rd quarter 2013
1.3		
	• Invoices	Monthly
1.5		
	• Monthly Progress Report	Monthly
1.6.1		
	• Draft Outline of the Final Report	1st quarter 2016
	• Final Outline of the Final Report	1st quarter 2016
1.6.2		
	• Draft Final Report	1st quarter 2016
	• Final Report	1st quarter 2016
1.7		
	• Written documentation of meeting agreements	1st quarter 2016

TASK #	DELIVERABLES	TENTATIVE DUE DATES
	• Schedule for completing closeout activities	1st quarter 2016
2		
	• 2016 Time Dependent Valuation of Energy Report	3rd quarter 2013
	• 2016 Valuation of Water Methodology Report	3rd quarter 2013
	• 2016 Standards – PV Cost-Effectiveness Study	TBD per Work Authorization
3		
	• 2016 Life Cycle Cost Analysis Report	3rd quarter 2013
4		
	• 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Functional Requirements	4th quarter 2014
	• 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Specifications	4th quarter 2014
	• 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software	4th quarter 2014
	• 2016 Nonresidential Building Energy Efficiency Standards Development Analysis Software Documentation	4th quarter 2014
5		
	• Recommendations for adopting ASHRAE 62.1 Ventilation Standards	1st quarter 2014
	• *2013 CBECC-Com* Ventilation modeling algorithms and rules	1st quarter 2015
6		
	• Updated versions of the 2013 *CBECC-Com* software, including updates to software documentation	TBD per Work Authorization
	• *CBECC-Com* ruleset for the Envelope Trade-off Approach	3rd quarter 2013
	• Software bug tracking mechanism	3rd quarter 2013
	• Compliance software source code posted to open source on-line software repository	First update 3rd quarter 2013. Future updates TBD per Work Authorization

TASK #	DELIVERABLES	TENTATIVE DUE DATES
7		
	• Nonresidential Standards Compliance Data Dictionary	TBD per Work Authorization
	• Nonresidential Standards Compliance Data Exchange Protocols	TBD per Work Authorization
	• Data Exchange Pilots with Standards Data Registries	3rd quarter 2013
	• Standards Data Repository Functional Requirements	TBD per Work Authorization
	• Standards Data Repository Database and User Interface Specifications	TBD per Work Authorization
8		
	• Proposed revisions to the nonresidential portions of the Action Plan	TBD per Work Authorization
9		
	• Draft and Final Voluntary nonresidential rating and disclosure program guidelines	1st quarter 2014
	• Recommendations for building industry awareness of nonresidential energy performance ratings and disclosures	TBD per Work Authorization
	• BEARS training curricula for Energy Assessors	TBD per Work Authorization
10		
	• Draft and Final Voluntary nonresidential building energy performance upgrade programs technical guidelines	TBD per Work Authorization
11		
	• Populated Nonresidential Building Energy Performance Database (NBEPD)	3rd quarter 2014
	• Urban Footprint Data Sets for Nonresidential Building Energy Baseline and Policy Scenarios	2nd quarter 2014

TASK #	DELIVERABLES	TENTATIVE DUE DATES
	• Nonresidential Performance Rating Methodology using the NBEPD	1st quarter 2014
	• Database analysis, visualization and reporting applications specific to nonresidential building energy efficiency decision support	3rd quarter 2015