



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:	Bruce Wilcox			Name:	Bruce Wilcox		
Address:	1110 Monterey Ave.			Address:	1110 Monterey Ave.		
City, State, Zip:	Berkeley, CA 94707			City, State, Zip:	Berkeley, CA 94707		
Phone:	510-528-4406	Fax:	510-588-4678	Phone:	510-528-4406	Fax:	510-588-4678
E-Mail:	bwilcox@lmi.net			E-Mail:	bwilcox@lmi.net		

L) Selection Process Used (For amendments, address amendment exemption or NCB, do not identify solicitation type of original agreement.)							
<input checked="" type="checkbox"/>	Solicitation	RFQ	Solicitation #:	RFQ-12-402	# of Bids:	1	Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes
<input type="checkbox"/>	Non Competitive Bid (Attach CEC 96)						
<input type="checkbox"/>	Exempt Select Exemption (see instructions)						

M) Contractor Entity Type	
<input checked="" type="checkbox"/>	Private Company (including non-profits)
<input type="checkbox"/>	CA State Agency (including UC and CSU)
<input type="checkbox"/>	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?		<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
If yes, check appropriate box:		<input type="checkbox"/> SB	<input type="checkbox"/> MB <input type="checkbox"/> DVBE

O) Civil Service Considerations	
<input type="checkbox"/>	Not Applicable (Agreement is with a CA State Entity or a membership/co-sponsorship)
<input type="checkbox"/>	Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)
<input checked="" type="checkbox"/>	The Services Contracted: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> are not available within civil service <input checked="" type="checkbox"/> cannot be performed satisfactorily by civil service employees <input checked="" type="checkbox"/> are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.
<input type="checkbox"/>	The Services are of such an: <ul style="list-style-type: none"> <input type="checkbox"/> urgent <input type="checkbox"/> temporary, or <input type="checkbox"/> 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	
<input checked="" type="checkbox"/>	A. Reimbursement in arrears based on: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Itemized Monthly <input type="checkbox"/> Itemized Quarterly <input type="checkbox"/> Flat Rate <input type="checkbox"/> One-time
<input type="checkbox"/>	B. Advanced Payment
<input type="checkbox"/>	C. Other, explain:



Q) Retention			
1. Is Agreement subject to retention?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	
If Yes, Will retention be released prior to Agreement termination?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> 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. <input type="checkbox"/> Exempt (Interagency/Other Government Entity)			
2. <input checked="" type="checkbox"/> Meets DVBE Requirements	DVBE Amount:\$ _____	DVBE %: 3%	
<input type="checkbox"/> Contractor is Certified DVBE			
<input checked="" type="checkbox"/> Contractor is Subcontracting with a DVBE:	DHS Associates		
3. <input type="checkbox"/> Contractor selected through CMAS or MSA with no DVBE participation.			
4. <input type="checkbox"/> Requesting DVBE Exemption (attach CEC 95)			

T) Miscellaneous Agreement Information			
1. Will there be Work Authorizations?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	
2. Is the Contractor providing confidential information?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	
3. Is the contractor going to purchase equipment?	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	
4. Check frequency of progress reports			
<input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Other...			
5. Will a final report be required?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	
6. Is the Agreement, with amendments, longer than a year? If yes, why?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	
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	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached	
2. Exhibit B, Budget Detail	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
3. CEC 96, NCB Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
4. CEC 30, Survey of Prior Work	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
5. CEC 95, DVBE Exemption Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
6. CEQA Documentation	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
7. Resumes	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached	
8. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> Attached	

 Agreement Manager Date Office Manager Date Deputy Director Date

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

Legal Business Name	Budget	SB	MB	DVBE
Benningfield Group	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frank A. Bergamaschi	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Big Ladder Software	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building Science Corporation	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calcerts, Inc	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calthorpe Associates	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chitwood Energy Management, Inc.	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Davis Energy Group	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DHS Associates	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Enercomp, Inc.	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EnergySoft, LLC	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fairbank, Maslin, Maulin, Metz & Associates	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heschong Mahone Group, A TRC Company	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itron, Inc.	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L'Monte Information Services	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National Renewable Energy Laboratory	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Philip Niles	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proctor Engineering Group	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rasant Solutions LLC	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Renewable Funding	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jennifer Roberts	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solar Consulting Services	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
StopWaste	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keith A. Temple	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
University of Illinois Urbana-Champaign, Illinois Sustainable Technology Center	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urban Land Use and Transportations Center at UC Davis	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
White Box Technologies	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wrightsoft Corp.	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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J) Budget Information

SEP	2012-2013	400.003	\$125,000
ERPA	2012-2013	100.152	\$1,000,000
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: \$4,493,879

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 residential buildings
- Developing Compliance Tools for 2013 & 2016 for residential building Standards
- Developing and Implementing the Residential 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 by the Energy Commission in June 2013
ARRA	American Reinvestment and Recovery Act of 2009
ASHRAE	American Society of Heating, Refrigeration and Air-conditioning Engineers
2013 CBECC-Res	California Building Energy Code Compliance software for low-rise residential buildings
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPUC	California Public Utilities Commission
CO ₂ e	Carbon Dioxide equivalent
CUAC	California Utility Allowance Calculator
Energy Commission	California Energy Commission
EUI	Energy Use Index, reported in units of kBtu per square feet
HERS Whole House Rating	Whole House Home Energy Rating System for existing residential buildings, Public Resources Code, Sections 25942, Title 20, California Code of Reg., Section 16. 70 et seq.
HVAC	Heating, Ventilating and Air Conditioning
IEPR	Integrated Energy Policy Report

ACRONYMS & TERMS	DEFINITION
PIER	Public Interest Energy Research program at the Energy Commission
Scoping Report	California Comprehensive Energy Efficiency Scoping Report
SEP	State Energy Program, U.S. Department of Energy
State	State of California
TCAC	Tax Credit Allocation Committee (State Treasurer's Office)
TDV	Time Dependent Valuation, used as the energy cost metric in the California Building Energy Efficiency Standards (Title 24, California Code of Regulations, Parts 1 and 6)

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 2-15 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 Agreement 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
<u>BUILDING STANDARDS TECHNICAL SUPPORT (Tasks 2-7)</u>	
2	2016 Residential Building Energy Efficiency Standards Development Analysis Software
3	Review ASHRAE Ventilation Standards
4	California Climate Data
5	Residential Compliance Software Deployment
6	Enhance and Support Data Exchange Infrastructure for Residential Standards Data Registries
7	2013 Residential Standards Simple Compliance Tool
<u>AB 758 TECHNICAL SUPPORT (Tasks 8-13)</u>	
8	Action Plan Support for Existing Buildings
9	Residential Ratings and Disclosure Programs for Existing Buildings
10	Residential Efficiency Improvement Programs for Existing Buildings
11	Residential Building Energy Performance Database for Existing Buildings
12	Affordable Housing
13	Compliance and Enforcement
<u>CONTINGENCIES</u>	
14	Contingencies and Additional Topic Areas for Building Standards Technical Support
15	Contingencies and Additional Topic Areas for AB 758 Technical Support

TASKS 1 – 15

TASK 1 – AGREEMENT MANAGEMENT

There are two funding sources for this Agreement. One funding source is for Building Standards work (tasks 2-7 & task 14); another funding source is for AB 758 work (tasks 8-13 & task 15). Part of the work authorization(s) for Agreement management will be funded from each of the two funding sources. The Agreement management work authorization(s) will reflect the maximum dollar amount that can be spent for Agreement management activities 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 Residential Building Energy Efficiency Standards (Standards) Technical Support

2016 Residential Building Energy Efficiency Standards' Development Support

TASK 2 – 2016 RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS DEVELOPMENT ANALYSIS SOFTWARE

The goal of this task is to update the 2013 *CBECC-Res* and *CSE*, 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 residential building designs, calculating annual energy budgets and providing comparative results. This software will use *CSE* to compute hourly building energy use, and modifications will be made to *CSE* as necessary to model new efficiency technologies. 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 such as *BEOpt*
- Develop method of creating automatic modifications of rulesets used in the 2013 *CBECC-Res* for use in parametric analyses
- 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 Residential HVAC and water heating
 - Advanced envelope modeling
 - Residential lighting
- Modify the 2013 *CBECC-Res* and *CSE* software as needed to work with a parametric run generator and to model new efficiency technologies that need to be modeled for the 2016 Residential Building Energy Efficiency Standards update

Deliverables:

- 2016 Residential Building Energy Efficiency Standards Development Analysis Software Functional Requirements
- 2016 Residential Building Energy Efficiency Standards Development Analysis Software Specifications
- 2016 Residential Building Energy Efficiency Standards Development Analysis Software
- 2016 Residential Building Energy Efficiency Standards Development Analysis Software Documentation
- Other deliverables to be defined as needed through Work Authorizations

TASK 3 – REVIEW ASHRAE VENTILATION STANDARDS

The goal of this task is to review the current ASHRAE 62.2 Ventilation Standards and make recommendations on whether or not the Energy Commission should adopt recent updates to ASHRAE 62.2 in the 2016 Residential Building Energy Efficiency Standards. The work in this task is expected to include, but not be limited to, the following:

- Review all updates to the ASHRAE 62.2 Standards that are not included in the 2013 Standards
- Validate that the control technologies included in the ASHRAE 62.2 Standards are both technologically feasible and cost-effective
- Develop and provide technological justification for recommendations to the Energy Commission on what components of the ASHRAE 62.2 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 62.2 ventilation standards in the 2016 Standards update
- Develop additional software modeling algorithms rules that need to be added to the 2013 *CBECC-Res* and *CSE* to model the energy impacts of the ventilation technologies that are recommended to the Energy Commission

Deliverables:

- Recommendations for adopting ASHRAE 62.2 Ventilation Standards
- Updated ventilation software modeling algorithms and rules, if necessary, in *CSE* and/or *CBECC-Res*
- Other deliverables to be defined as needed through Work Authorizations

TASK 4 – CALIFORNIA CLIMATE DATA

The goal of this task is to determine if it is appropriate for the 2016 Residential Building Energy Efficiency Standards to include requirements for buildings to be designed based on climate data more specific to physical locations than what is provided by any of the 16 climate zones currently used in the Standards. Another goal of this task is to establish weather data for California that is representative of the expected changes in weather in the future due to global climate change. The work in this task is expected to include, but not be limited to, the following:

- Develop methods to use a finer resolution of weather data for areas of the State that have unique micro-climates not adequately captured by the 16 climate zones currently used in the Standards
- Analyze whether the resolution of climate data should be different for modeling renewable energy generation, versus modeling the thermal behavior of residential buildings
- Review all available research on the extreme weather events expected in the future from global climate change, as these relate specifically to California locations

- Based on the available research, develop revisions to California weather data to include extreme weather events most likely to occur over the next 50 years

Deliverables:

- Hourly weather data for each unique micro-climate identified
- Hourly weather data for multiple climate regions, as specified by the CAM, that incorporates expectations of global climate change
- Other deliverables to be defined as needed through Work Authorizations

2013 Residential Standards Implementation Support

TASK 5 – RESIDENTIAL COMPLIANCE SOFTWARE DEPLOYMENT

The goal of this task is to support the Energy Commission’s deployment of the *California Building Energy Code Compliance (CBECC)-Res 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
- Pilot new versions of the 2013 *CBECC-Res* with building industry stakeholders
- Provide technical support to third-party software vendors for their integration of the 2013 *CBECC-Res* 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-Res* open source software project Include a software bug reporting mechanism on this public website

Deliverables:

- Updated versions of the 2013 *CBECC-Res* software, including updates to software documentation
- 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 6 – ENHANCE AND SUPPORT DATA EXCHANGE INFRASTRUCTURE FOR RESIDENTIAL STANDARDS DATA REGISTRIES

The goal of this task is to continue technical support for the data exchange protocols and data dictionary that together provide the necessary infrastructure on which private parties develop Residential Standards Data Registries. This work will include reviewing Standards compliance documentation, the current HERS Data Registry functions and database architectures, 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:

- Enhance data dictionary and data exchange protocols

- Update the residential compliance document xml template infrastructure that is specified in the 2013 Standards
- Pilot data exchange to/from registries
- Update the Data Registry Requirements Manual as needed

Deliverables:

- Updated Data Dictionary
- Updated Data Exchange Protocols
- Updated Data Registry Requirements Manual
- Data Exchange Pilot with Standards Data Registries
- Other deliverables to be defined as needed through Work Authorizations

TASK 7 – 2013 RESIDENTIAL STANDARDS SIMPLE COMPLIANCE TOOL

The goal of this task is to develop a simplified software tool that can be used to confirm compliance with the 2013 Residential Standards for building design projects that are limited to certain energy and water efficiency measures (e.g., to demonstrate compliance only with building envelope requirements) . This work will include building energy modeling and parametric analyses to derive a simplified method for demonstrating compliance with the residential performance Standards compliance that is consistent with the detailed performance standards compliance approach outlined in the 2013 Standards. The software to be developed in this task must be suitable to propose to the Energy Commission for certification as 2013 Residential Standards compliance software applicable in limited circumstances. This would allow building owners and/or their design consultants to use a simpler compliance approach that provides more options than the prescriptive Standard but does not require the time and complexity of performance-based Standards compliance demonstration.

The work in this task is expected to include, but not be limited to, the following:

- Develop the functional requirements for the 2013 Residential Standards Simple Compliance Tool
- Develop and document the software specifications for the 2013 Residential Standards Simple Compliance Tool that satisfy the functional requirements developed in this task
- Develop the software using the software specifications developed in this task

Deliverables:

- 2013 Residential Standards Simple Compliance Tool Functional Requirements
- 2013 Residential Standards Simple Compliance Tool Software Specifications
- 2013 Residential Standards Simple Compliance Tool
- 2013 Residential Standards Simple Compliance Tool Software Documentation
- 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 residential portions of the Comprehensive Energy Efficiency Program for Existing Buildings Action Plan (Action Plan)¹, and make 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 Residential portions of the Comprehensive Energy Efficiency Program for Existing Buildings Action Plan
- Other deliverables to be defined as needed through Work Authorizations

TASK 9 –RESIDENTIAL RATINGS AND DISCLOSURE PROGRAMS FOR EXISTING BUILDINGS

The goal of this task is to support the Energy Commission in the development of voluntary residential rating and disclosure program guidelines for single family and multi-family buildings. The technical assistance provided under this task may be used in a pre-rulemaking phase of a HERS proceeding. The work in this task is expected to include, but not be limited to, the following:

- Review and update energy performance rating metrics and baselines for existing residential buildings
 - Review options and select an approach to include a comparison of the rated buildings to code expectations in the derivation of the performance ratings
 - Use focus groups to judge how effective alternative rating metrics are at communicating the energy savings potential of homes
- Consider options as allowed by law to provide the energy performance valuation markets in California with a tiered approach to rating residential 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 Home Energy Rating System (HERS) raters. These preliminary ratings may 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 implementation software

¹ The Action Plan is expected to be released by the Energy Commission in June 2013

- Develop a rating approach that uses the energy use performance baselines and scenarios in the building energy performance maps (see Task 11) 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 the U.S. Department of Energy's Home Energy Score Application Programming Interface to develop relative performance rating software for HERS
 - Develop approaches to consider actual energy use in making energy efficiency recommendations to building owners, including calibrating approaches that build on evolving national development efforts
 - Extend HERS Whole House Rating software designed for single family homes to address multi-family buildings
- Provide technical assistance on HERS topics and/or software to the Energy Commission if necessary for HERS rating pilots included in utility Energy Upgrade California programs
 - Develop specifications for training and certification requirements for raters and contractors
 - Provide technical support for the rulemaking proceedings conducted by the Energy Commission to adopt mandatory residential rating and disclosure regulations
 - Provide building science research and analysis to address known HERS Whole House Rating Program implementation issues as well as those that arise in the comprehensive upgrade programs funded by the utilities
 - Provide support to the Energy Commission in completing updates or developing clarifications to the HERS Whole House Rating Program Technical Manual on an as-needed basis
 - Make modifications to the public goods HERS Whole House Rating Program modeling algorithms and data libraries to support the HERS Whole House Rating Program Technical Manual updates and clarifications
 - Develop technical guidelines, tutorials and other information for energy performance upgrade contractors as new areas of required knowledge in comprehensive residential upgrades are identified
 - Provide technical assistance to the Energy Commission to complete tasks identified in the Scoping Report² and Action Plan related to the Home Energy Rating System Program
 - Research and recommend strategies to increase public awareness of home energy performance ratings and disclosures
 - Use technical knowledge and expertise to develop training curricula for raters and contractors to implement HERS Whole House Rating programs

² Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report, August 2012, CEC-400-2012-015

- 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 residential rating and disclosure program guidelines
- Draft and Final Updated HERS Whole House Rating Program Technical Manual
- Recommendations for HERS Rating public awareness
- HERS Rating training curricula
- Other deliverables to be defined as needed through Work Authorizations

TASK 10 –RESIDENTIAL EFFICIENCY IMPROVEMENT PROGRAMS FOR EXISTING BUILDINGS

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

- Research methodology, measures, and guidelines necessary for implementing energy performance upgrades at time-of-sale that do not unreasonably or unnecessarily affect the home purchasing process or the ability of individuals to rent housing
- Develop technical guidelines for implementing voluntary residential building energy performance upgrade programs
- Work with Energy Commission staff to identify available financing opportunities for homeowners 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 technical guidelines for voluntary residential building energy performance upgrade programs
- Other deliverables to be defined as needed through Work Authorizations

TASK 11– RESIDENTIAL BUILDING ENERGY PERFORMANCE DATABASE (RBEPD) FOR EXISTING BUILDINGS

The goal of this task is to design, create and populate a database that contains estimates of energy use for large samples of existing residential 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 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 residential building energy modeling software, the California Simulation Engine (CSE), to model samples of California existing residential buildings
 - Build model prototypes for CSE using the residential building types established in Urban Footprint
 - Model these residential building prototypes in all sixteen (16) Title 24, Part 6 climate zones to establish existing residential 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 residential buildings modeled
- 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 residential 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

NOTE: Contractor may be required to sign a non-disclosure agreement to receive confidential data regarding energy use in residential buildings in order to perform this task.

Deliverables:

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

TASK 12 – AFFORDABLE HOUSING

The goal of this task is to support the Energy Commission in reducing the barriers to achieving energy efficiency upgrades in affordable housing stock. The Contract team shall complete work identified in the AB 758 Scoping Report and Action Plan process related to affordable housing. A "requirements" team will develop the specific mechanisms for removing barriers to achieving energy efficiency in existing affordable housing stock, and a separate "programming" team will maintain, repair, and update the Energy Commission's California Utility Allowance Calculator (CUAC) software tool. The work in this task is expected to include, but not be limited to, the following:

Roles of the "Requirements" team

- Develop requirements in conjunction with TCAC and other state and local housing agencies for energy efficiency and onsite renewable generation as a condition of subsidization for affordable housing projects
- Develop protocols and procedures for HERS ratings that specifically address the unique characteristics and equipment found in both high-rise and low-rise multi-family buildings that predominate in affordable housing

Roles of the "Programming" team

- Provide technical assistance to entities implementing the California Utility Allowance Calculator (CUAC) tool on a pilot basis
- Provide maintenance, repair, and updating to the CUAC tool, which may include, but is not limited to, the following:
 - Broadening of the tool to be usable for federal and state tax credits for major rehabilitation projects and other financing administered by local housing authorities
 - Confirm that the energy use estimates produced by CUAC match the residential and nonresidential energy use estimates in the 2013 public domain compliance software tools (California Building Energy Code Compliance (CBECC)-Res and CBECC-Com)
 - Modifications to the CUAC tool for use in upgrading existing multi-family buildings
 - Revisions to the CUAC tool staff interface to allow the online database to directly upload tariff and rate changes from an excel file into the database
 - Revisions to the CUAC tool staff interface to allow for viewing and editing of projects
 - Revisions of CUAC lighting and plug load calculations to correspond to HERS Whole House Rating Programs
 - Revisions of the CUAC print final process to allow for end user editing of water, trash and sewer rates and tariffs
 - Implement detailed verification of qualifications for Certified Energy Plans Examiners in the CUAC tool
 - Implement time of use tariffs in the CUAC tool
 - Refine Online CUAC print final output to include a cover letter with disclaimer language for affordable housing agencies and authorities

- Develop and Implement a Real-Time Query Capacity in the CUAC to verify user qualifications
- Revise natural gas input, calculations and outputs for uniformity with the way in which utilities charge for natural gas in the CUAC
- Revise the CUAC internal energy use calculations and the standard energy use assumptions that inform those calculations to allow for adjustments based on household type, specifically senior households
- Documentation of the Software Process Mapping of the Internet-Based CUAC Tool including but not limited to all translated User Interfaces, Print Functions, and Database functions

Deliverables:

- Procedures Manual for implementing HERS ratings in high-rise and low-rise multi-family affordable housing stock
- Revised CUAC software tool
- Other deliverables to be defined as needed through Work Authorizations

TASK 13 – COMPLIANCE AND ENFORCEMENT

The goal of this task is to complete work identified in the ~~residential~~ portions of the Scoping Report and Action Plan process related to energy code compliance and enforcement. The work in this task is expected to **cover both residential and nonresidential building permitting related to energy code and will** include, but not be limited to, the following:

- Work with Energy Commission staff to identify and develop software for streamlined permit application tools (such as online permit filing, mobile phone applications, etc.)
- Recruit and provide technical assistance to local building departments to pilot implementation of streamlined permitting processes. Monitor pilots to refine the processes and identify benefits and lessons learned
- Using technical knowledge of the 2008 and 2013 Residential Building Energy Efficiency Standards (Standards), assist Energy Commission staff in developing outreach materials and training curricula for building departments, contractors, and consumers that will include Standards requirements, highlight benefits of software tools for streamlined permit processes, and encourage building departments to implement streamlined permitting processes for additions, alterations, and measures beyond HVAC

Deliverables:

- Streamlined permit application software
- Outreach material and training curricula
- Other deliverables to be defined as needed through Work Authorizations

TASK 14 – CONTINGENCIES AND ADDITIONAL TOPIC AREAS FOR BUILDING STANDARDS TECHNICAL SUPPORT

The Contract team shall assist with work to develop program components beyond what is specifically described in Tasks 2-7 related to Building Standards technical support. 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 15 – CONTINGENCIES AND ADDITIONAL TOPIC AREAS FOR AB 758 TECHNICAL SUPPORT

The Contract team shall assist with work to develop program components beyond what is specifically described in Tasks 8-13 related to AB 758 technical support. 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 AB758 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		
	<ul style="list-style-type: none"> • Updated schedule of deliverables (if applicable) 	3 rd quarter 2013
1.3		
	<ul style="list-style-type: none"> • Invoices 	Monthly
1.5		
	<ul style="list-style-type: none"> • Monthly Progress Report 	Monthly

TASK #	DELIVERABLES	TENTATIVE DUE DATES
1.6.1		
	<ul style="list-style-type: none"> Draft Outline of the Final Report 	1 st quarter 2016
	<ul style="list-style-type: none"> Final Outline of the Final Report 	1 st quarter 2016
1.6.2		
	<ul style="list-style-type: none"> Draft Final Report 	1 st quarter 2016
	<ul style="list-style-type: none"> Final Report 	1 st quarter 2016
1.7		
	<ul style="list-style-type: none"> Written documentation of meeting agreements 	1 st quarter 2016
	<ul style="list-style-type: none"> Schedule for completing closeout activities 	1 st quarter 2016
2	<ul style="list-style-type: none"> 2016 Residential Building Energy Efficiency Standards Development Analysis Software Functional Requirements 	1 st quarter 2015
	<ul style="list-style-type: none"> 2016 Residential Building Energy Efficiency Standards Development Analysis Software Specifications 	2 nd quarter 2015
	<ul style="list-style-type: none"> 2016 Residential Building Energy Efficiency Standards Development Analysis Software 	1 st quarter 2016
	<ul style="list-style-type: none"> 2016 Residential Building Energy Efficiency Standards Development Analysis Software Documentation 	1 st quarter 2016
3	<ul style="list-style-type: none"> Recommendations for adopting ASHRAE 62.2 Ventilation Standards 	1 st quarter 2014
	<ul style="list-style-type: none"> Ventilation modeling algorithms and rules, if necessary 	1 st quarter 2015
4	<ul style="list-style-type: none"> Hourly weather data for each unique micro-climate identified 	2nd quarter 2014 1 st quarter 2015
	<ul style="list-style-type: none"> Hourly weather data for multiple climate regions, as specified by the CAM, that incorporates expectations of global climate change 	2nd quarter 2014 1 st quarter 2015
5		
	<ul style="list-style-type: none"> Updated versions of the 2013 <i>CBECC-Res</i> software, including updates to software documentation 	TBD per Work Authorization
	<ul style="list-style-type: none"> Software bug tracking mechanism 	3 rd quarter 2013

TASK #	DELIVERABLES	TENTATIVE DUE DATES
	<ul style="list-style-type: none"> Compliance software source code posted to open source on-line software repository 	First update 3 rd quarter 2013. Future updates TBD per Work Authorization
6		
	<ul style="list-style-type: none"> Updated Data Dictionary 	TBD per Work Authorization
	<ul style="list-style-type: none"> Updated Data Exchange Protocols 	TBD per Work Authorization
	<ul style="list-style-type: none"> Updated Data Registry Requirements Manual 	TBD per Work Authorization
	<ul style="list-style-type: none"> Data Exchange Pilot with Standards Data Registries 	3 rd quarter 2013
7		
	<ul style="list-style-type: none"> 2013 Residential Standards Simple Compliance Tool Functional Requirements 	4 th quarter 2014
	<ul style="list-style-type: none"> 2013 Residential Standards Simple Compliance Tool Software Specifications 	4 th quarter 2014
	<ul style="list-style-type: none"> 2013 Residential Standards Simple Compliance Tool 	4 th quarter 2014
	<ul style="list-style-type: none"> 2013 Residential Standards Simple Compliance Tool Software Documentation 	4 th quarter 2014
8		
	<ul style="list-style-type: none"> Proposed revisions to the Residential portions of the Comprehensive Energy Efficiency Program for Existing Buildings Action Plan 	TBD per Work Authorization
9		
	<ul style="list-style-type: none"> Draft and Final Voluntary residential rating and disclosure program guidelines 	1 st quarter 2014
	<ul style="list-style-type: none"> Draft and Final Updated HERS Whole House Rating Program Technical Manual 	1 st quarter 2014
	<ul style="list-style-type: none"> Recommendations for HERS Rating public awareness 	TBD per Work Authorization
	<ul style="list-style-type: none"> HERS Rating training curricula 	TBD per Work Authorization
10		

TASK #	DELIVERABLES	TENTATIVE DUE DATES
	<ul style="list-style-type: none"> Draft and Final Voluntary residential building energy performance upgrade programs technical guidelines 	TBD per Work Authorization
11		
	<ul style="list-style-type: none"> Populated Residential Building Energy Performance Database (RBEPD) 	3 rd quarter 2014
	<ul style="list-style-type: none"> Urban Footprint Data Sets for Residential Building Energy Baseline and Policy Scenarios 	2 nd quarter 2014
	<ul style="list-style-type: none"> Residential Performance Rating Methodology using the RBEPD 	1 st quarter 2014
	<ul style="list-style-type: none"> Database analysis, visualization and reporting applications specific to residential building energy efficiency decision support 	3rd quarter 2015
12		
	<ul style="list-style-type: none"> Procedures Manual for implementing HERS ratings in high-rise and low-rise multi-family affordable housing stock 	TBD per Work Authorization
	<ul style="list-style-type: none"> Revised CUAC software tool 	TBD per Work Authorization
13		
	<ul style="list-style-type: none"> Streamlined permit application software 	4 th quarter 2015
	<ul style="list-style-type: none"> Outreach material and training curricula 	TBD per Work Authorization