



**CALIFORNIA  
ENERGY COMMISSION**



**California Energy Commission  
September 13, 2023 Business Meeting  
Backup Materials for Agenda Item No 03h:  
ADM Associate, Inc.**

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Contract Request Form
3. Scope of Work

**RESOLUTION NO: 23-0913-03h**

**STATE OF CALIFORNIA**

**STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION: ADM Associate, Inc.**

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

**RESOLVED**, that the CEC approves agreement 800-23-002 with ADM for a \$350,000 contract to provide technical support for updating the Commercial Forecast Model. ADM will migrate forecast model code to modern software, revise key inputs (e.g., energy use intensities, saturations), improve forecasting capabilities, create a user manual, and provide training to staff; and

**FURTHER BE IT RESOLVED**, that the Executive Director or their designee shall execute the same on behalf of the CEC.

**CERTIFICATION**

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the CEC held on September 13, 2023.

AYE:

NAY:

ABSENT:

ABSTAIN:

Dated:

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Kristine Banaag  
Secretariat



## CONTRACT REQUEST FORM (CRF)

### A. New Agreement Number

**IMPORTANT:** New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: 800-23-002

### B. Division Information

1. Division Name: Energy Assessment
2. Agreement Manager: Mohsen Abrishami
3. MS- Not Applicable
4. Phone Number: 916-397-0790

### C. Contractor's Information

1. Contractor's Legal Name: ADM Associates Incorporated
2. Federal ID Number: 94-256479

### D. Title of Project

Title of project: Commercial Forecast Model Update

### E. Term and Amount

1. Start Date: August 1, 2023
2. End Date: December 31, 2025
3. Amount: \$350,000

### F. Business Meeting Information

1. Operational agreement to be approved by Executive Director? No
2. Are the ARFVTP agreements \$75K and under delegated to Executive Director?
3. The Proposed Business Meeting Date: 09-13-2023
4. Consent or Discussion? Consent
5. Business Meeting Presenter Name: Mohsen Abrishami
6. Time Needed for Business Meeting:
7. The email subscription topic is: Energy Policy (Integrated Energy Policy Report)
8. Agenda Item Subject and Description:

#### Commercial Forecast Model Update Project

ADM Associates Incorporated (ADM). Proposed resolution approving Agreement 800-23-002 with ADM for a \$350,000 contract to provide technical support for updating the Commercial Forecast Model, and adopting staff's determination that this action is exempt from CEQA. ADM will migrate forecast model code to modern software, revise key inputs (e.g., energy use intensities, saturations), improve forecasting capabilities, create a user manual, and provide training to staff. (General Fund Funding)

### G. California Environmental Quality Act (CEQA) Compliance

#### 1. Is Agreement considered a "Project" under CEQA? No

If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and 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:

**2. If Agreement is considered a "Project" under CEQA answer the following questions.**

**a) Agreement IS exempt?**

No

Statutory Exemption?

No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

PRC section number: PRC section number 1, PRC section number 2. Or, "None"

CCR section number: CCR section number 1, CCR section number 2. Or, "None"

Categorical Exemption?

Enter Yes or No

If yes, list CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

CCR section number: CCR section number 1, CCR section number 2. Or, "None"

Common Sense Exemption? 14 CCR 15061 (b) (3)

Enter Yes or No

Yes

If yes, explain reason why Agreement is exempt under the above section. If no, enter "Not applicable" and go to the next section.

Enter "Not applicable" or reason why Agreement is exempt under the above section

Work under this contract consists of providing technical expertise to the Energy Assessments Division, involving data forecasting and analysis on computers, in an office environment. Work under this contract will not involve any physical construction or installations. Therefore, it can be seen with certainty that there is no possibility that work under this contract may have a significant effect on the environment, and this work is not subject to CEQA.

**b) Agreement IS NOT exempt.**

**IMPORTANT:** consult with the legal office to determine next steps.

Enter Yes or No

If yes, answer yes or no to all that applies. If no, list all as "no" and "None" as "yes".

Additional Documents	Applies
Initial Study	Enter Yes or No
Negative Declaration	Enter Yes or No
Mitigated Negative Declaration	Enter Yes or No
Environmental Impact Report	Enter Yes or No
Statement of Overriding Considerations	Enter Yes or No
None	Enter Yes or No



## H. Subcontractors

List all Subcontractors listed in the Budget (s). Insert additional rows if needed. If no subcontractors to report, enter "No subcontractors to report" and "0" to funds. **Delete** any unused rows from the table

Subcontractor Legal Company Name	Budget
Dav Energy Solutions Inc.	\$ 11,018

## I. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter "No key partners to report." **Delete** any unused rows from the table.

Key Partner Legal Company Name
No Key Partners

## J. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
General Funds	2022/2023	800.100	\$350,000

**TOTAL Amount:** \$350,000

R&D Program Area: Enter R&D Program Area. Example: EDMFO: EDMF

Explanation for "Other" selection Enter explanation for "Other"

Reimbursement Contract #: Enter Reimbursement Contract Number

Federal Agreement #: Enter Federal Agreement Number

## K. Contractor's Contact Information

### 1. Contractor's Administrator/Officer

Name: Sasha Baroiant

Address: 3239 Ramos Circle

Sacramento, CA 95827

Phone: 916-363-1788, 916-363-8383

E-Mail: sasha@admenergy.com



## 2. Contractor's Project Manager

Name: Sasha Baroiant

Address: 3239 Ramos Circle

Sacramento, CA 95827

Phone: 916-363-1788, 916-363-8383

E-Mail: sasha@admenergy.com

## L. Selection Process Used

There are three types of selection process. List the one used for this CRF.

Selection Process	Additional Information
Competitive Solicitation #	Solicitation No.: RFP-22-802 Number of Bids: 4 Low Bid: Not Applicable
Non Competitive Bid ( <i>Attach DGS-GSPD-09-007</i> <a href="https://www.dgs.ca.gov/PD/Forms">https://www.dgs.ca.gov/PD/Forms</a> )	Enter "Non Competitive" selection process used or "Not Applicable".
Exempt	Enter "Exemption" selection process used or "Not Applicable".

## M. Contractor Entity Type

Contractor Entity Type	Yes or No?
Private Company ( <i>including non-profits</i> )	Yes
CA State Agency ( <i>including UC and CSU</i> )	No
Government Entity ( <i>i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state</i> )	No

## N. Is Contractor a certified Small Business (SB), Micro Business (MB) or Disabled Veterans Business Enterprise (DVBE)?

The contractor is a certified: SB & DVBE

## O. Civil Service Considerations

- Not Applicable (Agreement is with a CA State Entity or a membership/co-sponsorship)? No
- Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER): No
- The Services Contracted: No



If no, go to the next question. If yes, which of the following applies to the contract? More than one can apply, list each answer choice, and separate them with a comma:

- are not available within civil service
- cannot be performed satisfactorily by civil service employee
- 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 following applies to the contract: "are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system".

- d. The Services are of such an urgent, temporary, or occasional nature that the delay to implement under civil service would frustrate their very purpose?

"Urgent"

**Justification:**

This type of expertise is not available through civil service. This technical support contract provides the necessary specialized expertise and technical support to complement staff's current analytic capabilities. It also fills in highly technical and specialized knowledge gaps that will be needed to quickly and accurately assess California's ever changing and highly integrated energy systems.

**P. Payment Method**

1. Is the payment method Reimbursement, Advanced Payment, or Other?

"Reimbursement"

If Other, explain: Enter explanation for "Other" payment method.

2. If Reimbursement, is it in arrears based on Itemized Monthly, Itemized Quarterly, Flat Rate, or One-time?

"Itemized Monthly"

**Q. Retention**

Is Agreement subject to retention? No

If Yes, Will retention be released prior to Agreement termination? Enter Yes or No.

**R. Justification of Rates**

The rates are similar to the rates for this company in a previous contract.

**S. Disabled Veteran Business Enterprise Program (DVBE)**

Provide requested additional information.

1. Exempt (Interagency/Other Government Entity) No.
2. Meets DVBE Requirements DVBE Yes  
Amount: \$ \$ 11,018, DVBE %: 3.15%
3. Is the Contractor Certified DVBE or Subcontracting with a DVBE? If subcontracting with a DVBE, provide the name of the DVBE company. If none applies, enter "Not Applicable".  
Dav Energy Solutions, Inc.
4. Contractor selected through CMAS or MSA with no DVBE participation No.



5. Requesting DVBE Exemption (attach CEC 95) No.

**T. Miscellaneous Agreement Information**

1. Will there be Work Authorizations? No.
2. Is the contractor providing confidential information? No.
3. Is the contractor going to purchase equipment? No.
4. What is the check frequency of the progress reports? Monthly, Quarterly, or Other? If Other, please provide explanation.

Monthly

5. Will a final report be required? No.
6. Is the Agreement, with amendments, longer than three years? If yes, why? No

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

List all items that should be attached to this CRF by entering "Yes" or "No".

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	DGS-GSPD-09-007, NCB Request	No
4	CEC 95, DVBE Exemption Request	No
5	Awardee CEQA Documentation	No
6	Resumes	Yes
7	CEC 105, Questionnaire for Identifying Conflicts	Yes

**Approved By**

Individuals who approve this form must enter their full name and approval date in the MS Word version.

**Agreement Manager:** Mohsen Abrishami

**Approval Date:** 06/08/2023

**Office Manager:** Heidi Javanbakht

**Approval Date:** 06/08/2023

**Deputy Director:** Aleecia Gutierrez

**Approval Date:** 06/08/2023



## **Exhibit A**

### **SCOPE OF WORK**

#### **TASK LIST**

<b>Task #</b>	<b>Task Name</b>
1	Agreement Management
2	Migrate Code from FORTRAN to Python or R
3	Update Input Files with the Most Recent Data
4	Update and Improve Model Code
5	Calibration Recommendation
6	Provide Documentation and Training to CEC Staff
7	Provide Tech Support for a Period of One Year

#### **ACRONYMS/GLOSSARY**

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

<b>Acronym</b>	<b>Definition</b>
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEUS	Commercial End-Use Survey
CFM	Commercial Forecast Model
Contractor	ADM Associates Incorporated
FSSAT	Fuel Substitution Scenario Analysis Tool
HELM	Hourly Electric Load Model

#### **BACKGROUND/PROBLEM STATEMENT**

The Commercial Sector Forecast is an essential work product for the California Energy Commission. The model used to generate the forecast is called the Commercial Forecast Model (CFM). It is an end-use annual electricity and natural gas demand forecasting model. The first version of the model was developed in the late 1970's; and since then, it has been revised and updated by Energy Commission staff. The model is built in FORTRAN and is run in the Command Prompt environment. A separate run is made for each of the seven utilities that are currently part of the model by specifying the name of the utility on the command line. There is a set of input files for each of the utilities that describe the attributes and characteristics of commercial buildings within the service area of each utility. In addition, the model generates several different output files.

The CFM accounts for commercial sector growth, commercial building and equipment characteristics collected in the Commercial End Use Survey (CEUS), codes and standards, and committed energy efficiency. Additional achievable energy efficiency, fuel substitution (building electrification), transportation electrification, and distributed generation are accounted for in other models (outside of the CFM), and these models necessarily have consistent inputs and approaches. Hourly load shapes are currently applied in a separate model.

Results are incorporated into the California Energy Demand Forecast used by utilities, the California Public Utilities Commission, and the California Independent System Operator for grid planning and procurement. The commercial forecast model also serves as the baseline for the long-term demand scenarios which assess the impacts of decarbonization strategies on energy demand through 2050.

### **GOALS/OBJECTIVES OF THE AGREEMENT**

The Contractor will provide technical assistance to the Energy Assessment Division by timely executing deliverables and updates needed, for CEC review, for the existing Commercial Forecast Model (CFM). This workload may include but is not limited to migrating code and incorporating updated data, codes, and standards, and presenting those products to the CAM for input and review.

### **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 web site:

[http://www.energy.ca.gov/contracts/consultant\\_reports/index.html](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:

- 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.

## **TASK 1- AGREEMENT MANAGEMENT**

### **Task 1.1 Kick-off Meeting**

The goal of this task is to establish the lines of communication, review the scope of work, and decide on file transfer processes. At the kick-off meeting, the CEC team will provide an overview of the Energy Commission's current CFM, how the CFM fits within the CEC's larger forecast modeling efforts, challenges with the current CFM, and goals of the tasks within this Contract.

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

- Attend a "kick-off" meeting with the CAM and CEC team. The meeting will be held via Web-Ex or teleconference. The Contractor shall include their Project Manager key team members 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 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 1.3 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 1.4 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

**TECHNICAL TASKS****Task 2 - MIGRATE CODE FROM FORTRAN TO PYTHON OR R**

The goal of this task is to migrate the existing code from FORTRAN to either Python or R programming language. The results of the new model shall be reasonably identical to the existing FORTRAN model.

The Contractor shall establish a default format for input and output data in Excel, based on the existing American Standard Code for Information Interchange (ASCII) input and output files. Copies of the data files containing end use intensities (EUIs), saturations, floor space and other relevant data for each building type and end use by utility service area and climate zone will be provided by the Energy Commission staff. In addition, the model should include a user-friendly interface to allow the user to enter specific parameters for each run (i.e., single utility/forecast zone run, or all at once, marking output files with run version number and identifier, directory where the run output files are stored, etc.

**The Contractor shall:**

- Discuss with CAM how the model is currently used, its interactions with other forecasting models, and the improvements needed. Discuss recent relevant updates to the residential model.
- Provide an implementation plan for migrating the FORTRAN code to R or Python, including a recommendation and justification for which programming language to use.
- Migrate code to Python or R based on direction from CAM.
- Develop new input and output data file formats, for CAM review.
- Develop for CAM review a user-friendly interface to allow the user to enter specific parameters for each run.

- Test the new model to ensure results are reasonably identical to the FORTRAN model.

**Deliverables:**

- Implementation plan and recommendation for choosing the new platform (Python or R)
- New code for CAM review
- Documentation comparing the results of the new model to the existing model
- New input and output data file formats
- User-friendly interface to allow the user to enter specific parameters for each run
- Test results

**Task3 - UPDATE INPUT FILES WITH MOST RECENT DATA**

The goal of this task is to review the existing input files and update the relevant fields with data from the latest CEUS and other available sources including sources provided by the Energy Commission and/or data sources that are commonly used in studies and analyses related to the commercial sector. Update the input files to incorporate the savings associated with the latest codes and standards and committed energy efficiency programs. Ensure the model is consistent with other forecasting tools or models including the Additional Achievable Energy Efficiency (AAEE) analysis and the Fuel Substitution Scenario Analysis Tool (FSSAT) used by the Efficiency Analysis Unit. For example, ensure that there is agreement with the Efficiency Analysis Unit on which energy efficiency savings are considered committed so that savings are not double-counted.

An additional goal of this task is to review and update the methodology used for mapping the old forecast zones to the new forecast zones used by CEC. Review the recently revised methodology used for the residential sector to see if the same or similar approach could be used.

Another goal of this task is the calibration of the energy intensities input data (kWh/SqFt & kBTU/SqFt). The baseline for the energy data is set to 1975 values (pre-Standards). The subsequent year's values are defined as a percentage of the baseline adjusted to savings associated with Building and Appliances standards. The data from the two most recent CEUS represent snapshots of the energy consumption for the years covered by the two surveys. The goal of this task is to review the existing CEUS data and determine if it is feasible to calibrate the existing energy input data based on the two surveys' data - in effect establishing two new baselines.

**The Contractor shall:**

- Meet with CEC staff to understand the current methodology for mapping the older forecast zones to the new forecast zones, and to understand the recently revised methodology for the

residential sector. Recommend an improved approach and, following direction from CAM, implement the CAM's approved approach.

- Meet with the Efficiency Analysis Unit staff to understand the FSSAT inputs, outputs, and analyses and come to agreement on which energy efficiency and fuel substitution measures will be included in the CFM and what will be modeled in FSSAT. Ensure analyses of codes, standards, efficiency, and electrification measures are consistent.
- Create a set of new input files in Excel with the latest building characteristics, energy efficiency programs, and codes and standards data.
- Review the current calibration of the energy intensities and update, if needed, using the two vintages of CEUS.
- Document the sources of all inputs.

**Deliverables:**

- Updated input file for each of the seven utilities (by forecast zone, building-type, and end-use) that uses the updated approach for mapping data collected under the older forecast zones to the new forecast zones.
- Updated input files for CAM review, that will include savings associated with the most recent codes and standards and other energy efficiency programs and updating energy intensities as needed.
- Documentation on the approach for mapping data collected under older forecast zones to the new forecast zones.
- Documentation on the sources for all inputs, along with documentation of any data cleaning and preparation steps required to enter the data into the input file format.

**Task 4 - UPDATE AND IMPROVE MODEL CODE**

The goal of this task is to recommend and implement improvements to the model design. One improvement that CEC staff would like is the ability to easily change (increase or decrease) the number of utilities, forecast zones, building types and end uses in the future, if needed.

CEC staff would like to capture uncertainty in the commercial sector energy demand forecast. This could involve a method to identify key uncertain variables such as the weather or economic conditions and then use random draws to create a probability distribution around the forecast result.

CEC staff would also like to consider how Advanced Metering Infrastructure (AMI) data could be used in this model in the future.

The existing Commercial model is only capable of generating annual forecast. CEC staff would also like to consider how AMI data could be used in this model to generate hourly forecast. Currently, HELM 2.0 model (in R script) is used to generate hourly forecast based. One option would be to call HELM from within the new Commercial model. There may be other opportunities identified for improvements as the new model is developed.

**The Contractor shall:**

- Meet with CEC staff to discuss current model limitations and inefficiencies, and the improvements that CEC staff have been thinking about.

- Develop recommendations for a way to easily change the number of utilities, forecast zones, building types and end uses; and, following CAM direction, implement the approved method.
1. • Recommend options, for CAM review, an approach to create a probability distribution around the commercial sector demand forecast to capture uncertainty. Implement the approach if budget allows.
  2. Recommend options to add the capability of generating hourly forecast, including the feasibility of adding the HELM model as subroutine/module to the new Commercial model
  3. Recommend model improvements, their priority level, expected cost and level of effort. Come to agreement with the CAM on which improvements to implement.
  4. Implement the model improvements agreed to, that can be completed within budget and timeframe of this contract

Deliverables:

#### 4.1 New code

### **TASK 5 – CALIBRATION RECOMMENDATION**

The goal of this task is to provide input and advice on how to improve the calibration step. Staff currently calibrates its model results by comparing model output to demand in the most recent historical year for which data is available and adjusting the output so that they match. It does this before incorporating load modifiers such as impacts from rooftop solar and electric vehicles. Calibration is complicated by the COVID-19 pandemic and its impact on energy consumption in 2020 and 2021, which may make these years unsuitable for calibration. Calibration must also take into account that historical data on demand inevitably includes the impacts of load modifiers that are not captured in the model. Staff anticipate having access to AMI data for future forecasts, and these data may be useful for calibration. Additionally, the calibration methodology for the residential model is also undergoing an update, which will be completed by the time this task is undertaken and may be a useful starting point for updating the commercial model calibration.

Another goal of this task is to update the Calibration subroutine (CM08.FOR) that is part of the current FORTRAN code. This subroutine utilizes data and algorithms from the Energy Commission's Summary model which is part of the post-processing to calibrate the raw commercial energy demand forecast results. The Summary model adjusts the raw forecast results by considering factors that are not built-in into the Commercial model (e.g., program savings, EV charging, etc.). It also makes adjustments to Heating, Ventilation and Air Conditioning (HVAC) end-uses due to variation in weather conditions and calculates calibration factors.

#### **Contractor shall:**

- Meet with CEC staff to understand the current calibration process and to understand the recently updated calibration process for the residential forecasting model
- Review the latest version of the Summary Model (in R script); and following CAM direction update the calibration subroutine
- Recommend improvements or an alternative calibration approach and discuss the feasibility with CEC staff. Following CAM's direction, implement improvements or alternative.

**Deliverables:**

- Memo or PowerPoint documenting the new calibration approach directed by CAM
- Revised calibration subroutine

**TASK 6 – PROVIDE DOCUMENTATION AND TRAINING TO CEC STAFF**

The goal of this task is to document how the model works, the steps for running the model, define the inputs and outputs, and provide training to CEC staff on how to use the model.

**The Contractor shall:**

- Create a user manual documenting the input file format, how to input data into the model, steps for running the model, and output files. The manual shall include a flow chart of the analyses conducted, and descriptions of the algorithms used in the model. The manual will also include a dictionary of the input and output data files. The manual shall also include documentation on how to update the code, if needed.
- Provide up to 8 hours of training for CEC staff to learn the model

**Deliverables:**

- User Manual
- Up to eight hours of training

**TASK 7 - PROVIDE TECH SUPPORT THROUGH THE END OF 2025**

The goal of this task is to provide technical support on an as-needed basis, as CEC staff run the model on their own and have questions or find bugs that need to be resolved.

**The Contractor shall:**

- Document responses to questions via e-mail
- Enhanced or revised documentation for areas that may need correction or further clarification, as directed by the CAM.
- Fix bugs in the model, as directed by the CAM.

**Deliverables:**

- E-mail response to questions for documentation (as needed)
- Updated documentation (as needed)
- Updated model code (as needed)



## SCHEDULE OF DELIVERABLES AND DUE DATES

Task Number	Deliverable	Due Date
<b>1</b>		
1.1	An Updated Schedule of Deliverables	If applicable
1.2	Monthly Invoices	Monthly with progress report
1.4	Monthly Progress Reports	Monthly
1.5	Email Documenting Key Decisions, Next Steps, and Action Items	After each bi-weekly meeting
<b>2</b>		
2.1	Provide the Rationale for the Choosing New Platform (Python or R)	May 30, 2023
2.2	New Code	June 30, 2023
2.3	Documentation Comparing the Results of the New Model to the Existing Model	June 30, 2023
2.4	New Input and Output Data File Formats	June 30, 2023
2.5	User-friendly interface to allow the user to enter specific parameters for each run	June 30, 2023
<b>3</b>		
3.1	Updated Input File for Each of the Seven Utilities (by forecast zone, building type, and end use) that uses the updated approach for mapping data collected under the older forecast zones to the new forecast zones	July 15, 2023
3.2	Update the existing input files by updating the savings associated with the most recent codes and standards and other energy efficiency programs	July 31, 2023
3.3	Documentation on the approach for mapping data collected under the older forecast zones to the new forecast zones	July 31, 2023
3.4	Documentation on the sources for all inputs, along with documentation of any data cleaning and preparation steps required to enter the data into the input file format	July 31, 2023
<b>4</b>		
4.1	New code	August 31, 2023
<b>5</b>		
5.1	Memo or PowerPoint documenting the new calibration approach	September 15, 2023
5.2	Revised calibration subroutine	September 29, 2023
<b>6</b>		
6.1	User Manual	October 16, 2023
6.2	Up to 8 Hours of Training	TBD
<b>7</b>		
7.1	Email Response to Questions for Documentation	As needed
7.2	Updated Documentation (as needed)	As needed
7.3	Updated Model Code (as needed)	As needed