



**CALIFORNIA
ENERGY COMMISSION**



**California Energy Commission
January 21, 2025 Business Meeting Backup
Materials for Verdant Associates LLC**

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

[PROPOSED]

RESOLUTION NO: 25-121-03g

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

RESOLUTION: Verdant Associates LLC

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 800-24-003 with Verdant Associates LLC for an up to \$1,000,000 three-year contract. This agreement will initially provide \$500,000 for use of CEC's Investor-Owned Utilities distribution system data and advanced metering infrastructure data to create a statewide model in Arras Energy, a high-performance agent-based simulation modeling tool. Additional funding, up to \$1,000,000 total, may, with approval from the CEC's Executive Director through an amendment, be added to further support the modeling tool; 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 January 21, 2025.

AYE:

NAY:

ABSENT:

ABSTAIN:

Dated:

Kristine Banaag
Secretariat



CONTRACT REQUEST FORM (CRF)

A. New Agreement Number

New Agreement Number: 800-24-003

B. Division Information

1. Division Name: Energy Assessments Division
2. Agreement Manager: Allen Le
3. MS-20
4. Phone Number: (916) 237-2518

C. Contractor's Information

1. Contractor's Legal Name: Verdant Associates LLC
2. Federal ID Number: 85-1131755

D. Title of Project

Title of project: Distributed Energy and Electrification Analysis

E. Term and Amount

1. Start Date: 01/31/2025
2. End Date: 01/30/2028
3. Amount: \$500,000

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? No
3. The Proposed Business Meeting Date: 01-21-25
4. Consent or Discussion? Consent
5. Business Meeting Presenter Name: Allen Le
6. Time Needed for Business Meeting: 0 minutes.
7. The email subscription topic is: Integrated Energy Policy Report

Agenda Item Subject and Description: Verdant Associates LLC. Proposed resolution approving agreement 800-24-003 with Verdant Associates LLC for an up to \$1,000,000 three-year contract. This agreement will initially provide \$500,000 for use of CEC's Investor-Owned Utilities distribution system data and advanced metering infrastructure data to create a statewide model in Arras Energy, a high-performance agent-based simulation modeling tool. Additional funding, up to \$1,000,000 total, may, with approval from the CEC's Executive Director through an amendment, be added to further support the modeling tool. (General Funds) Contact: Allen Le

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: the work in this contract is



providing technical expertise to the Energy Assessments Division, which involves forecasting and analysis and doesn't change the environment.

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

a) Agreement IS exempt?

N/A

Statutory Exemption?

N/A

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: None

CCR section number: None

Categorical Exemption?

N/A

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: None

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

N/A

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

Not Applicable

b) Agreement IS NOT exempt.

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

N/A

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	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	yes

H. Is this project considered "Infrastructure"?

No

I. 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
Eudoxys Sciences LLC	\$ 114,988
Lawrence Livermore National Laboratory	\$ 115,000
Hitachi America LTD.	\$ 40,000

J. 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 Partner to report

K. 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 Fund	FY-24-25	800.100	\$500.000

TOTAL Amount: \$500,000

R&D Program Area: Not Applicable

Explanation for "Other" selection Not Applicable

Reimbursement Contract #: Not Applicable

Federal Agreement #: Not Applicable

L. Contractor's Contact Information

1. Contractor's Administrator/Officer

Name: Beth Fruehling

Address: 1972 Los Angeles Avenue

City, State, Zip: Berkeley, CA 94707

Phone: (763) 232-4494

E-Mail: beth@verdantassoc.com



2. Contractor's Project Manager

Name: Stephan Barsun

Address: 1972 Los Angeles Avenue

City, State, Zip: Berkeley, CA 94707

Phone: (916) 801-2594

E-Mail: stephan@verdantassoc.com

M. Selection Process Used

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

Selection Process	Additional Information
Competitive Solicitation #	RFP-24-801, # of bids 2

N. Contractor Entity Type

Contractor Entity Type	Yes or No?
Private Company (<i>including non-profits</i>)	Yes

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

The contractor is a certified: SB.

P. 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: Yes.

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.

- 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:

These services are by their very nature “urgent” and of such an “occasional nature” that it would not be feasible to implement them under civil service. This type of expertise is not readily 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.

Q. Payment Method

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

Reimbursement.

If Other, explain: N/A.

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

Itemized Monthly.

R. Retention

Is Agreement subject to retention? Yes.

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

S. Justification of Rates

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

T. Disabled Veteran Business Enterprise Program (DVBE)

Provide requested additional information.

1. Exempt (Interagency/Other Government Entity) No.
2. Meets DVBE Requirements DVBE No.
Amount: \$ 0 DVBE %:0%
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”.
Not Applicable
4. Contractor selected through CMAS or MSA with no DVBE participation Not Applicable.
5. Requesting DVBE Exemption (attach CEC 95) Yes.

U. Miscellaneous Agreement Information

1. Will there be Work Authorizations? Yes.
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



V. 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	Yes
5	Awardee CEQA Documentation	No
6	Resumes	No
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:

Approval Date:

Office Manager:

Approval Date:

Deputy Director:

Approval Date:

Exhibit A SCOPE OF WORK

TASK LIST

Task #	Task Name
1	Agreement Management
2	Examine Existing Data Sources
3	Develop Grid Models
4	Develop Load Models & Baseline Analysis
5	Develop a Cost & Revenue Impacts Methodology
6	Train Staff on Scenario Analysis
7	General Technical Support for Model Development

ACRONYMS/GLOSSARY

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

Acronym	Definition
CAM	Commission Agreement Manager
DGS	Department of General Services
DVBE	Disabled Veteran Business Enterprises
RFP	Request for Proposal
IOU	Investor-Owned Utility
EPIC	Electric Power Investment Charge
DER	Distributed Energy Resource
PM	Project Manager
AMI	Advanced Metering Infrastructure
GLOW	GridLAB-D Open Workspace
Arras	CEC's Commercial Open Source Distribution Grid Modeling Software

BACKGROUND/PROBLEM STATEMENT

California is a leader in advancing renewable energy generation; developing efficiency standards for buildings and appliances; advancing load management and flexible demand appliances; and supporting the development and implementation of DER, broad building decarbonization, and a growing market of electric vehicles. To meet the state's clean energy goals, it is necessary to evaluate the distribution grid implications for future electrification and DER adoption scenarios.

This project will use CEC's IOU distribution system data and advanced metering infrastructure (AMI) data to create a statewide model in Arras Energy. Arras Energy, formerly HiPAS GridLAB-D, is a high-performance agent-based simulation model funded by CEC's Electric Power Investment Charge (EPIC) research & development program. This version of GridLAB-D was specifically developed for four California use cases: load electrification, DER hosting capacity, tariff design, and distribution system resilience. In conjunction, GridLAB-D Open Workspace (GLOW) will be used as a front-end software to provide a graphical user interface to integrate Arras Energy into a visual based tool. GLOW was created to allow a greater audience to use the tool without prior knowledge of code-based files that Arras Energy only uses.

This project will incorporate historical distribution assets and Advanced Metering Infrastructure (AMI) data with a bottom-up load forecasting methodology. The goal is to provide locational and temporal information on where and when distribution grid enhancements may be needed. CEC will utilize the tool developed under this project to generate policy recommendations and strategies that can provide greater grid reliability, building decarbonization, and customer value. The insights from this project will also improve energy demand and supply forecasts for the state; and guide the development and implementation of programs that deploy building and energy system decarbonization measures.

GOALS AND OBJECTIVES OF THE AGREEMENT

CEC is seeking specialized expertise in a buildout of the state's electric distribution grid model to support the CEC in assessing various electrification and distributed energy resource (DER) adoption scenarios. This project must use open-source software Arras Energy, and evaluate the reliability, equity and cost implications of emerging DER integration strategies. CEC also requires assistance in training staff on using the tool developed under this project to analyze current and future data as the electric distribution grid evolves.

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

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 4.6 or above
- Microsoft ASP.NET MVC 5.0 or above
- Microsoft ASP.Net Core 6.0 or above
- Microsoft Entity Framework 6.0 or above
- Microsoft Internet Information Services IIS 10.0 or above
- Microsoft SQL Server 2016 or above
- Microsoft SQL Reporting Services 2016 or above
- Visual Studio.NET 2019 or above
- Python, C# Programming Language with layered architectures (Presentation, Business logic, Data Access).
- MSSQL (Structured Query Language).
- Bootstrap 5.0 or above
- XML and JSON.
- Telerik, Redgate, and Postman
- AWS, Snowflake and Salesforce

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

Task 1.1 Kick-off Meeting

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

Expected General Classifications: Analyst, Scientist, Engineer, Project Manager, Director

The Contractor shall:

- Generate an agenda for the meeting and submit it to CAM.
- Attend a “kick-off” meeting with the CAM, the Contracts Officer, and a representative of the Accounting Office. The meeting will be held via Zoom or teleconference. 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.
- Submit signed Information Security Program Plan Attestation that Contractor has an Information Security Program Plan (ISPP) that meets the minimum requirements as stated in SAM 5300 and any other applicable law. CAM will provide ISPP Attestation form.
- Submit signed Non-Disclosure Agreements (NDAs) from Contractor and Subcontractor employees prior to the sharing of confidential information with the employees. CAM will provide NDA form.
- Contractor shall ensure that all individuals employed by Contractor or a Subcontractor who will have access to confidential information take an annual security awareness training and submit the Employee Security Awareness Training Certificates.
- Submit verification that confidential information and personal information is destroyed at agreement end (or when work is completed).

The CAM shall:

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

Deliverables:

- Draft and Final Agendas
- Summary of the kickoff to be included in the monthly progress report.
- Signed non-disclosure agreement from Contractor and Subcontractor employees
- Signed Information Security Program Plan Attestation Form
- Employee Security Awareness Training Certificates
- Verification of destruction of confidential information and personal information

Task 1.2 Invoices

Expected General Classifications: Accountant, Analyst, Scientist, Engineer, Project Manager, Director

The Contractor shall:

- Prepare invoices for all reimbursable expenses incurred performing work under this Agreement in compliance with 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:

- Monthly invoice (to be included with monthly progress reports)

Task 1.3 Progress Reports

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

Expected General Classifications: Project Manager, Director

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 (including monthly invoice)

TECHNICAL TASKS**Task 2: Examine Existing Data Sources**

The goal of this task is to identify necessary grid datasets for the project, receive confidential data from CEC, audit these datasets for potential quality issues and inaccuracies, and propose remedies as needed. The primary datasets for this project include the CEC-hosted electric interval metering data for PG&E, SDG&E, and SCE and their respective distribution networks, also referred to as the Energy Safety Data hosted by the Office of Energy Infrastructure Safety.

The Contractor shall:

- Examine all the current data sources required to effectively build feeder and load models to give a holistic perspective on the state's electric distribution grid.
- Working with CEC staff, develop a list of data requirements to build feeder models and securely transfer data sources for examination. The requirement should include distribution models, load models, geographical data, and other necessary data to conduct various analysis scenarios, which may include, but are not limited to, power flow analysis, electrification analysis, and tariff analysis. Examination will be conducted to the level of detail that available data, project timeline, and budget allow.
- Work with CEC's Data Engineering Unit to access necessary datasets.
- Examine the input datasets for any potential gaps and missing records.
- Propose remedies for missing or inconsistent data.
- Report findings from data auditing and proposed remedies in a Data Auditing Report.
- The IOU distribution networks are being stored in ArcGIS format. Contractor shall convert ArcGIS into CVS files or another format that is compatible with Arras Energy.

Deliverables:

- Data Auditing Report for AMI Data
- Data Auditing Report for IOU Distribution Networks

Task 3: Developing Grid Models

The goal of this task is to upload IOU distribution data containing primary and secondary feeders in Arras Energy. In consultation with CEC staff, the contractor may build a unique model for each IOU or combine all three IOUs in a single model.

The Contractor shall:

- Prepare CEC's IOU distribution system data (in ArcGIS format) for upload to Arras Energy. Utilize GLOW as the simulation interface
- Seek data resources for accurately modeling building panel capacity limitations in California

Deliverables:

- Preliminary IOU Grid Model(s) in Arras Energy (script file)
- Grid Model Manual(s)

Task 4: Developing Load Models & Baseline Analysis

The goal of this task is to prepare CEC's AMI data for the grid models (e.g., merge customer IDs) and provide analysis and recommendations for CEC staff to independently determine whether the built-in electrification scenarios in Arras Energy satisfy CEC's scenario development needs. Development will be conducted to the level of detail that available data, project timeline, and budget will allow.

The Contractor shall:

- Create load models and load profiles for each distribution node associated with specific customer IDs.
- Combine existing data sets to successfully create feeder models for future analysis.
- Provide analysis of the built-in electrification scenarios in Arras Energy. CEC staff will independently determine based in part on Arras analysis whether built-in electrification

scenarios satisfy CEC's scenario development needs. If required by the CAM, Contractor will build a separate model to allow CEC staff to simulate more detailed scenarios.

- Conduct initial baseline analysis to ensure feeder models are functioning properly. The analysis should be performed on all developed feeder models.

Deliverables:

- Load Generation Model (script file)
- Load Generation Model Manual(s)
- Baseline Analysis/Simulation Report

Task 5: Develop a Cost & Revenue Impacts Methodology

The goal of this task is to develop a methodology for estimating utility cost and revenue impacts of various electrification and DER integration scenarios by using the simulation results generated under previous tasks.

The Contractor shall:

- Gather data from utility reports and CPUC proceedings related to distribution grid update costs
- Develop a method to calculate the distribution upgrade or buildout cost impacts of electrification and DER by running 8760 load shapes provided by CEC staff.
- Develop a method to calculate the utility revenue impacts of electrification and DER by running projected 8760 load shapes under the relevant rate group.
- Integrate cost and revenue impact analysis to calculate the net cost of a proposed electrification scenario simulated in the grid model(s).

Deliverables:

- Cost & Revenue Impacts Methodology Report

Task 6: Training Staff on Scenario Analysis

Prepare a document that guides staff on the use of the developed baseline scenario and provide training to staff on the tool used to edit, analyze, and conduct simulation scenarios. Work will be initiated at the direction of CEC staff and will be conducted to the level of detail that available data, project timeline, and budget allow.

The Contractor shall:

- Develop training materials and determine an appropriate number of one hour training sessions for CEC staff to work independently
- Help staff develop the capabilities to run new electrification and DER scenarios, including any fundamental concepts, scenario planning features, and how to update inputs for the baseline scenarios

Deliverables:

- Staff training webinars
- Staff training records/documentation

Task 7: General Technical Support for Model Development

The goal of this task is to assist CEC staff in incorporating newer distribution data Grid model updates as they become available and use the latest version of Arras Energy software. This task is additional to the core tasks listed above and is subject to the availability of additional funding.

The Contractor shall:

- To be determined

Deliverables:

- To be determined

SCHEDULE OF DELIVERABLES AND DUE DATES

Note: Specific dates are to be established at the kickoff

Task Number	Deliverable	Due Date
1.1	Agendas for the Kick-off Meeting	February 2025
1.2	Monthly Invoice	Monthly
1.3	Monthly Progress Reports	Monthly
2	Data Auditing Report – AMI Data	May 2025
2	Data Auditing Report – IOU Distribution Infrastructure	May 2025
3	IOU Grid Model(s)	August 2025
4	IOU Grid Model Manual(s)	August 2025
4	Load Generation Model(s)	November 2025
4	Load Generation Model Manual(s)	November 2025
4	Baseline Analysis/Simulation Report	November 2025
5	Cost & Revenue Impacts Methodology Report	February 2026
6	Staff Training Webinars	<i>As needed</i>
6	Staff Training Documentation	<i>As needed</i>