STATE OF CALIFORNIA
CONTRACT REQUEST FORM (CRF)
CEC-94 (Revised 10/2015) CALIFORNIA ENERGY COMMISSION

A) New Agreement 300-17-005 (To be completed by CGL Office)

ERDD	Joe O`Hagan	43	916-327-1368

Energetics Incorporated	52-1165598

Research Roadmap for Cost and Technology Breakthroughs for Renewable Energy Generation

	6/4/2018	11/29/2019	$ 338,059

☐ Operational agreement (see CAM Manual for list) to be approved by Executive Director
☐ ARFVTP agreements under $75K delegated to Executive Director.

Proposed Business Meeting Date	5/9/2018	☐ Consent	☒ Discussion
Business Meeting Presenter	Joe O`Hagan	Time Needed:	5 minutes

Please select one list serve. EPIC (Electric Program Investment Charge)

Agenda Item Subject and Description

ENERGETICS, INC. Proposed resolution approving Agreement 300-17-005 with Energetics, Inc. for a $338,059 contract to identify, describe and prioritize key research development and demonstration (RD&D) needs on cost and technology breakthroughs for renewable energy generation. Research will focus on those efforts that can increase the cost competitiveness, flexibility, and reliability of renewable energy generation and operation in California to inform future research investments leading to increased contributions of renewable energy into the state's grid. (EPIC funding) Contact: Joe O'Hagan. (Staff presentation: 5 minutes)

1. Is Agreement considered a "Project" under CEQA?
   ☐ Yes (skip to question 2) ☒ No (complete the following (PRC 21065 and 14 CCR 15378)):
   Explain why Agreement is not considered a "Project":
   Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because Section 15306: Class 6 consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. The project will develop a research roadmap to strategically frame research priorities, potential partnerships, and critical technology milestones to support EPIC portfolio decisions and accelerate progress toward more cost competitive, flexible and reliable renewable energy generation, operation, and storage. For these reasons, the proposed project will not result in a serious or major disturbance to an environmental resource.
2. If Agreement is considered a "Project" under CEQA:
   ☐ a) Agreement **IS** exempt. (Attach draft NOE)
   ☐ Statutory Exemption. List PRC and/or CCR section number: _____
   ☐ Categorical Exemption. List CCR section number: _____
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   _____
   ☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
   Check all that apply
   ☐ Initial Study
   ☐ Negative Declaration
   ☐ Mitigated Negative Declaration
   ☐ Environmental Impact Report
   ☐ Statement of Overriding Considerations

Legal Company Name:	Budget	SB	MB	DVBE
Renewable Energy Consulting Services, Inc.	$ 9,000	☐	☐	☐
Solar Power Consulting	$ 10,800	☐	☐	☐
DAV Energy Solutions, Inc.	$ 21,780	☒	☐	☒
TSS Consultants	$ 20,299	☒	☐	☐
Center for Sustainable Energy	$ 35,000	☐	☐	☐
	$	☐	☐	☐
	$	☐	☐	☐
	$	☐	☐	☐
	$	☐	☐	☐

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

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	16-17	301.001D	$338,077
			$
			$
			$
			$
			$
R&D Program Area: EGRO: Renewables		TOTAL:	$
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

K) Contractor's Administrator/ Officer				**Contractor's Project Manager**			
Name:	Karen Kirkpatrick			Name:	Jonathan Rogers		
Address:	7075 Samuel Morse Dr Ste 100			Address:	7075 Samuel Morse Dr Ste 100		
City, State, Zip:	Columbia, MD 21046-3433			City, State, Zip:	Columbia, MD 21046-3433		
Phone:	410-953-6274 /	Fax:	- -	Phone:	203-912-4664 /	Fax:	- -
E-Mail:	kkirkpatrick@energetics.com			E-Mail:	jrogers@energetics.com		

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

☒ Solicitation Select Type Solicitation #: RFP-17-303 # of Bids: 4 Low Bid? ☒ No ☐ Yes
☐ Non Competitive Bid *(Attach CEC 96)*
☐ Exempt Select Exemption (see instructions)

M) Contractor Entity Type

☒ Private Company *(including non-profits)*
☐ CA State Agency *(including UC and CSU)*
☐ Government Entity *(i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)*

N) Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE? ☒ No ☐ Yes
If yes, check appropriate box: ☐ SB ☐ MB ☐ DVBE

O) Civil Service Considerations

☐ Not Applicable (Agreement is with a CA State Entity or a membership/co-sponsorship)
☐ Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)
☐ The Services Contracted:
- ☐ are not available within civil service
- ☐ cannot be performed satisfactorily by civil service employees
- ☐ are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.

☒ The Services are of such an:
- ☐ urgent
- ☒ temporary, or
- ☐ occasional nature

that the delay to implement under civil service would frustrate their very purpose.

Justification:
This roadmap will entail an intensive 18 month effort to compile and prioritize research ideas from a vast network of subject matter experts. The roadmap will guide future research efforts and is not anticipated to be repeated.

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P) Payment Method

☒ A. Reimbursement in arrears based on:
☒ Itemized Monthly ☐ Itemized Quarterly ☐ Flat Rate ☐ One-time
☐ B. Advanced Payment
☐ C. Other, explain:

Q) Retention

1. Is Agreement subject to retention?	☐ No	☒ Yes
If Yes, Will retention be released prior to Agreement termination?	☒ No	☐ Yes

R) Justification of Rates

This contract was selected through a competitive solicitation process. As part of this competitive solicitation process, 15 percent of the total score is based on the bidder's cost compared to the lowest bidder's cost. Another 10 percent of the total score was awarded based upon the reasonableness of the direct and indirect rates as well as the ratio of direct and fringe benefits to the loaded rates.

S) Disabled Veteran Business Enterprise Program (DVBE)

1. ☐ Exempt (Interagency/Other Government Entity)
2. ☒ Meets DVBE Requirements DVBE Amount:$ 21,780.00 DVBE %: 6.4
   ☐ Contractor is Certified DVBE
   ☒ Contractor is Subcontracting with a DVBE: DAV Energy Solutions, Inc.
3. ☐ Contractor selected through CMAS or MSA with no DVBE participation.
4. ☐ Requesting DVBE Exemption (attach CEC 95)

T) Miscellaneous Contract Information

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

The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.

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

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

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date

EXHIBIT A
SCOPE OF WORK

I. TASK ACRONYM/TERM LISTS

TASK LIST

Task #	CPR[1]	Task Name
1		Administration and Contract Management
2	X	Technical Assessment of Grid Connected Renewable Energy and Storage Technologies and Strategies
3		Finalize Methodology for Developing the Research Roadmap
4		Develop the Research Roadmap
5		Finalize the Research Roadmap

ACRONYMS/GLOSSARY

Acronym	Definition
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
EPIC	Electric Program Investment Charge
TAC	Technical Advisory Committee

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to fund the development of a research roadmap that will identify, describe and prioritize research, development, demonstration and deployment (RDD&D) of technology opportunities that have potential to achieve high-penetration of renewable energy into California's electricity grid.

B. Problem/ Solution Statement

Problem

Advancing renewable energy is a key part of the state's efforts to achieve a statewide goal to reduce greenhouse gas emissions 40 percent below 1990 levels and to increase to 50 percent the electricity derived from renewable sources by 2030. Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016) (SB 32) put into law a statewide goal to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030. The Clean Energy and Pollution Reduction Act of 2015 (De León, Chapter 547, Statutes of 2015) (Senate Bill 350) put into law a requirement to serve 50 percent of California's electricity use with renewable energy resources by 2030.

More specifically, Governor Brown's Clean Energy Jobs Plan states that by 2020, California should produce 20,000 new megawatts (MH) of renewable electricity, including 8,000 MW of

[1] Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

central station renewable capacity, accelerate the development of energy storage capacity and take other measures.

The Energy Commission estimates that about 27 percent of its electricity retail sales in 2016 or over 26,000 MW were served by renewable energy generated by facilities of 1 MW in capacity or more from sources such as wind, solar, geothermal, biomass, and small hydroelectric. Despite California's success in increasing renewable energy generation, looking forward there remains significant challenges for integrating large amounts of renewable electricity into the state's electric grid to achieve the 50 percent renewable generation.

The vast majority of renewable energy in California today is represented by wind and solar which pose challenges to the state's grid because generation from these resources may vary over time in periods as short as seconds. This makes it difficult for grid operators to maintain a constant balance between generation supply and demand while also meeting requirements for controlling frequency and voltage fluctuations. To achieve this, grid operators must rely on natural-gas fired generation and/or curtailment of renewable energy generation to balance electricity flows on the grid.

Cost is also a significant barrier to greater renewable energy penetration of the California grid. Renewable technologies have a wide range of costs depending on the technology. More mature technologies, like geothermal and biomass, have a narrower range of levelized cost than emerging technologies, although biomass costs too can vary depending on feedstock availability. Historically, some renewable technologies had levelized costs greater than those of conventional generation, but this is changing. However, transmission line connection and grid integration costs remain high.

Solution

This Research Roadmap on Cost and Technology Breakthroughs for Renewable Energy Generation will focus on technologies and solutions that increase the cost competitiveness, flexibility and reliability of renewable energy generation and operation to facilitate greater renewable energy penetration in the state's grid. Topics that will be addressed include:

- Reductions in renewable energy capital and operating costs
- Development of faster renewable energy ramping rate flexibility
- Increase in non-variable renewable capacity
- Improved integrated resource forecasting
- Advancements in low-cost, high efficient grid connected (utility scale) storage
- Critical transmission line architectural and telemetry needs
- Other factors facilitating renewable energy siting
- Other barriers and possible solutions to achieving greater use of renewable energy and storage

C. Goals and Objectives of the Agreement

Agreement Goals

The goal of this Agreement is to develop, in consultation with stakeholders and subject matter experts, a research roadmap that identifies, describes and prioritizes key RDD&D needs for research on cost and technology breakthroughs for renewable energy generation. Specifically, this research roadmap must provide, based upon the input of stakeholders and experts:

- An assessment of the current status of grid connected renewable energy and storage within California, including costs, trends and performance targets of emerging renewable energy technologies as well as identifying what emerging and breakthrough technologies are possible.
- Identify significant barriers to achieving greater use of renewable energy and storage in California and the information needed to address these barriers.
- Assess current research efforts both at the state and federal level that are addressing these knowledge gaps.
- Identify suitable research gaps at the applied, demonstration and deployment stages that may be addressed by the EPIC Program.
- Develop a methodology for prioritizing future research needs in the near (1 to 3 years), mid-term (3-5 years) and long-term (>5 years).
- Apply this methodology to the research gaps to prioritize near, mid- and long-term research needs.
- Identify critical indicators of success for renewable energy resource technologies and strategies, as well as a methodology utilizing these indicators to estimate benefits, including benefits to IOU electric ratepayers.
- Develop performance and cost targets, and other metrics to be critical indicators of research success and the probability of marketing success.
- Provide comprehensive references, workshop summaries, comments and attendees to document road mapping process.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefit of lower costs by identifying and prioritizing research that will address cost constraints that reduce the competitiveness of renewable energy in California while developing new uses and markets for renewable energy.

Technological Advancement and Breakthroughs:[3] This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by strategically targeting future EPIC investments in a manner that provides optimal benefits to IOU electric ratepayers, and maximizes the use of public research and development investments.

Agreement Objectives

The objective of this Agreement is the development of the renewable energy research roadmap, that will focus on technologies and solutions that increase the cost competitiveness, flexibility and reliability of renewable energy generation and storage as well as improved operation to facilitate greater renewable energy penetration in the state's grid.

[2] California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

[3] California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

III. TASK 1 GENERAL PROJECT TASKS

DELIVERABLES

Subtask 1.1 Deliverables
The goal of this subtask is to establish the requirements for submitting project deliverables (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Contractor must provide deliverables as required below by the dates listed in the **Schedule of Deliverables (Part V).** Deliverables that require a draft version are indicated by marking **"(draft and final)"** after the deliverable name in the "Deliverables" section of the task/subtask. If "(draft and final)" does not appear after the deliverable name, only a final version of the deliverable is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Contractor shall:
For deliverables that require a draft version, including the Final Report Outline and Final Report

- Submit all draft deliverables to the CAM for review and comment in accordance with the Schedule of Deliverables (Part V). The CAM will provide written comments to the Contractor on the draft deliverable within 15 days of receipt, unless otherwise specified in the task/subtask for which the deliverable is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final deliverable.
- Submit the revised deliverable with responses and comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For deliverables that require a final version only

- Submit the deliverable to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all deliverables

- Submit all data and documents required as deliverables in accordance with the following:

  Instructions for Submitting Electronic Files and Developing Software:

  - **Electronic File Format**
    Submit all data and documents required as deliverables under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission's software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

    The following describes the accepted formats for electronic data and documents provided to the Energy Commission as deliverables under this Agreement, and establishes the software versions that will be required to review and approve all software deliverables:
    - Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.

- Text documents will be in MS Word file format, version 2007 or later.
- Documents intended for public distribution will be in PDF file format.
- The Contractor must also provide the native Microsoft file format.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

o **Software Application Development**
Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- 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 Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting
The goal of this *subtask* 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 Commission Agreement Officer (CAO), and any other Energy Commission staff relevant to the Agreement. The Contractor will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The <u>administrative portion</u> of the meeting will include discussion of the following:
  - o Terms and conditions of the Agreement;
  - o Deliverables (subtask 1.1);
  - o CPR meetings (subtask 1.3);
  - o Match fund documentation (subtask 1.7);
  - o Permit documentation (subtask 1.8);
  - o Subcontracts (subtask 1.9); and
  - o Any other relevant topics.

The technical portion of the meeting will include discussion of the following:
- o The CAM's expectations for accomplishing tasks described in the Scope of Work;
- o An updated Project Schedule;
- o Deliverables (subtask 1.1);
- o Progress reports and invoices (subtask 1.5);
- o Final Report (subtask 1.6);
- o Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
- o Any other relevant topics.

- Provide an *Updated Schedule of Deliverables, List of Match Funds,* and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:
- Designate the date and location of the meeting.
- Send the Contractor a *Kick-off Meeting Agenda*.

Contractor Deliverables:
- Updated Schedule of Deliverables *(if applicable)*
- Updated List of Match Funds *(if applicable)*
- Updated List of Permits *(if applicable)*

CAM Deliverable:
- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings
The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, deliverables, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Contractor. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Contractor, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Contractor, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Contractor shall:
- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Deliverables* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required

for Task 2, submit the Task 2 deliverables along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:
- Determine the location, date, and time of each CPR meeting with the Contractor's input.
- Send the Contractor a *CPR Agenda* and a *List of Expected CPR Participants* in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Contractor with a *Schedule for Providing a Progress Determination* on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, deliverables, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Contractor with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Contractor revise one or more deliverables.

Contractor Deliverables:
- CPR Report(s)
- Task Deliverables (draft and/or final as specified in the task)

CAM Deliverables:
- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

Subtask 1.4 Final Meeting
The goal of this subtask is to complete the closeout of this Agreement.

The Contractor shall:
- Meet with Energy Commission staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Contractor and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any state-owned equipment.
    - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.

- The Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables).
- Need to document the Contractor's disclosure of "subject inventions" developed under the Agreement.
- "Surviving" Agreement provisions such as repayment provisions and confidential deliverables.
- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Contractor and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Deliverables* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Deliverables:

- Final Meeting Agreement Summary *(if applicable)*
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Deliverables

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Contractor shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Deliverables:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review the Final Report, which will be due at least **two months** before the Agreement end date. When creating the Final Report Outline and the Final Report, the Contractor must use the Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Contractor shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. *(See Task 1.1 for requirements for draft and final deliverables.)*

Contractor Deliverables:

- Final Report Outline (draft and final)

CAM Deliverables:

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Contractor shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (required)
    - Credits page on the reverse side of cover with legal disclaimer (required)
    - Acknowledgements page (optional)
    - Preface (required)
    - Abstract, keywords, and citation page (required)
    - Table of Contents (required, followed by List of Figures and List of Tables, if needed)
    - Executive summary (required)
    - Body of the report (required)
    - References (if applicable)
    - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
    - Bibliography (if applicable)
    - Appendices (if applicable) (Create a separate volume if very large.)
    - Attachments (if applicable)
  - Ensure that the document is written in the third person.
  - Ensure that the Executive Summary is understandable to the lay public.
    - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
    - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
    - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
  - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
  - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.

- Include a brief description of the project results in the Abstract.

- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Deliverables:
- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

CAM Deliverable:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds
The goal of this subtask is to ensure that the Contractor obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Contractor may spend match funds for this task. The Contractor may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Contractor must obtain any associated commitments before incurring any costs for which the Contractor will request reimbursement.

The Contractor shall:
- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement.
- If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

  If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind

contribution is equipment or other tangible or real property, the Contractor must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

  - A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Deliverables:
- Match Funds Status Letter
- Supplemental Match Funds Notification Letter *(if applicable)*
- Match Funds Reduction Notification Letter *(if applicable)*

Subtask 1.8 Permits
The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Contractor may incur any costs related to the use of the permit(s) for which the Contractor will request reimbursement.

The Contractor shall:
- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If <u>no permits</u> are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
  - The schedule the Contractor will follow in applying for and obtaining the permits.

  The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Deliverables:
- Permit Status Letter
- Updated List of Permits *(if applicable)*

- Updated Schedule for Acquiring Permits *(if applicable)*
- Copy of each Approved Permit *(if applicable)*

Subtask 1.9 Subcontracts
The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Contractor shall:
- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Deliverables:
- Subcontracts *(draft if required by the CAM)*

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)
The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:
- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
  - Technical area expertise;
  - Knowledge of market applications; or
  - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review deliverables and provide recommendations for needed deliverable adjustments, refinements, or enhancements.
  - Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
  - Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project deliverables.

The TAC may be composed of qualified professionals spanning the following types of disciplines:
- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers,

architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Contractor shall:
- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Deliverables:
- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings
The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Contractor shall:
- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

Deliverables:
- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials

- TAC Meeting Summaries

IV. TECHNICAL TASKS

TASK 2 TECHNICAL ASSESSMENT OF GRID CONNECTED RENEWABLE ENERGY AND STORAGE TECHNOLOGIES AND STRATEGIES

The goal of this task is to develop a technical assessment of the current baseline and best in class renewable energy resource technologies and strategies, including cost and performance attributes.

The Contractor shall:

- Prepare a *Literature Review* of peer reviewed technical journals, government reports, trade journals and other high quality sources of information regarding performance specifications of technology used in current renewable energy installations. Include references for all sources.
- Prepare and submit a draft *List of Experts to Interview* regarding the current cost and performance attributes of renewable energy resource technologies and strategies; developing trends and opportunities of specific technologies and strategies to facilitate increased penetrations of renewable energy resources into the electrical grid; and identify other critical indicators of success.
- Prepare and submit a draft list of *Interview Questions* to use when interviewing experts on topics listed above.
- Submit the final *List of Experts* and final *Interview Questions*, incorporating the CAM's comments.
- Conduct interviews with experts regarding pathways to integrating high-penetrations of renewable energy resources into the electrical grid, baseline and best in class renewable energy technologies and strategies, including cost and performance attributes of specific renewable energy resource technologies, current and anticipated research and critical indicators of success.
- Using information from the literature review and expert interviews, prepare and submit a draft *Outline of the Technical Assessment* to the CAM for review and approval. The CAM will provide written comments to the Contractor. The Contractor shall review the comments and discuss any concerns regarding the recommended changes with the CAM.
- Submit the final *Outline of the Technical Assessment*, incorporating the CAM's comments.
- Submit draft *Technical Assessment of Grid Connected Renewable Energy and Storage Technologies and Strategies* to Technical Advisory Committee for review and comment. Make changes as appropriate.
- Submit the draft *Technical Assessment of Grid Connected Renewable Energy and Storage Technologies and Strategies* that follows the approved outline for review and comment. The CAM will provide written comments to the Contractor. The Contractor shall review the comments and discuss any concerns regarding the recommended changes with the CAM.
- Submit the final *Technical Assessment of Grid Connected Renewable Energy and Storage Technologies and Strategies,* incorporating the CAM's comments*.*
- Prepare CPR Report and participate in CPR Meeting as described is subtask 1.3.

Deliverables:

- Literature Review Report (Draft and Final).
- List of Experts to Interview (Draft and Final).
- Interview Questions (Draft and Final).

- Outline of the Technical Assessment (Draft and Final).
- Technical Assessment of Renewable Energy Resources Technologies and Strategies (Draft and Final).

TASK 3 FINALIZE METHODOLOGY FOR DEVELOPING THE RESEARCH ROADMAP
The goal of this task is to finalize the methodology for developing the *Research Roadmap for Cost and Technology Breakthroughs for Renewable Energy Generation* (Research Roadmap). The Contractor shall finalize the methodology based on comments from Energy Commission staff on the draft methodology submitted in Technical Assessment to be prepared in Task 2.

The Contractor shall:

- Meet with the CAM, and others invited by the CAM, including the Technical Advisory Committee to discuss finalizing the methodology for developing the Research Roadmap. This strategy meeting shall take place within ten (10) business days after the Kick-Off Meeting. This strategy meeting will be held at the Energy Commission.
- Prepare and submit a *Summary of Comments* received at the strategy meeting.
- Finalize the *Methodology for Developing the Research Roadmap* by incorporating feedback from CAM and Energy Commission staff.

Deliverables:

- Methodology for Developing Research Roadmap (Draft and Final).
- Summary of Expert's Comments.

TASK 4 DEVELOP THE RESEARCH ROADMAP
The goal of this task is to develop the Research Roadmap in accordance with methodology finalized in Task 3. When creating the Research Roadmap, the Contractor must use the Style Manual provided by the CAM.

The Research Roadmap must include but may not be limited to the following:

- A detailed description of critical barriers preventing the state from achieving its goals for integrating high-penetrations of renewable energy resources in IOU service territories.
- Summary analysis of past and current research efforts and results around key topics identified in the Research Roadmap.
- Description of RDD&D gaps and recommended and prioritized RDD&D activities for each topic needed to achieve cost-effective integration of high-penetrations of renewable energy resources, including:
  - Technical performance and cost targets for promising technologies.
  - Critical indicators of success.
  - Sequencing and prioritization of recommended RDD&D activities.
  - Estimated funding amounts.
  - Coordination and timing with other activities and programs.
- Description of the Methodology used in developing the research roadmap. This should include a list of experts and stakeholders, including their organization and area of expertise, consulted during the development of the research roadmap.

- An analysis of probable path to market success, including description of critical milestones and performance, costs and other indicators of the probability of marketing success.

The Contractor shall:

Conduct the following activities in accordance with the methodology finalized in Task 3:

  - Incorporate information from the Technical Assessment to be prepared in Task 2 into the Research Roadmap.
  - Coordinate and collaborate with Energy Commission staff, including periodic check-in points with the CAM at key milestones and decision-points in the development of the Research Roadmap.
  - Solicit input from experts and stakeholders on RDD&D gaps and needs for key topics in the research roadmap.
  - Solicit input from Technical Advisory Committee on RDD&D gaps and needs for key topics in the research roadmap.
  - Identify and prioritizing the most important RDD&D gaps.
  - Identify critical indicators of success.
  - Identify and recruiting experts and stakeholders to participate in topic specific workshops
  - Coordinate with Energy Commission staff to identify and select venue(s) for topic specific workshops (including plans for recording and creating detailed workshop transcripts)
  - Create all necessary presentation materials and hand-outs for workshop attendees
  - Coordinate with Energy Commission staff on handling logistics for scheduling, setting up and facilitating workshop(s) to solicit input from experts and stakeholders on RDD&D gaps and needs for key topics in the Research Roadmap.
  - Develop a public workshop agenda with CAM.
  - Upon approval of the public workshop agenda from CAM, conduct the public workshop to solicit stakeholder comments on the Research Roadmap themes.
- Prepare and submit a summary of all interviews and questionnaires conducted with subject matter experts and industry stakeholders as part of the Research Roadmap development in a *Summary of all Workshop Outcomes and Interviews*.
- Submit the draft *Research Roadmap* 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.

Deliverables:

- Summary of all Workshop Outcomes and Interviews.
- Public Workshop Agenda (Draft and Final).
- Research Roadmap (Draft).

TASK 5 FINALIZE THE RESEARCH ROADMAP

The goal of this task is to finalize the *Research Roadmap* in accordance with the Methodology finalized in Task 3. The *Research Roadmap* shall be written in a format that is beneficial for both technical experts and a more general audience, including visual aids to outline priority research areas. The *Research Roadmap* shall include an executive summary that summarizes findings. The *Research Roadmap* shall also include a discussion of how estimates regarding customer adoption and technology development were concluded.

The Contractor shall:

- Submit the final *Research Roadmap*.
- Submit *Bibliography* of all relevant sources and materials used in preparation of the *Research Roadmap*.
- Prepare and submit *Analytical Data* used to prepare the estimates included in the *Research Roadmap*.
- Coordinate with CAM on handling logistics for scheduling, setting up and facilitating workshop(s) to solicit input on *Research Roadmap*.
- Conduct, with approval from CAM, a public workshop to solicit stakeholder comments on the *Research Roadmap*
- Compile public comments into a *Public Workshop Meeting Minutes* document.
- Incorporate public comments, as appropriate into the final *Research Roadmap.*

Deliverables:

- Final Research Roadmap.
- Bibliography.
- Analytical Data.
- Public Workshop Meeting Minutes.

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 18-0509-21

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: ENERGETICS, INC.

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

RESOLVED, that the Energy Commission approves Agreement 300-17-005 with Energetics, Inc. for a $338,059 contract to identify, describe and prioritize key research development and demonstration (RD&D) needs on cost and technology breakthroughs for renewable energy generation. Research will focus on those efforts that can increase the cost competitiveness, flexibility, and reliability of renewable energy generation and operation in California to inform future research investments leading to increased contributions of renewable energy into the state's grid; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall execute the same on behalf of the Energy Commission.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on May 9, 2018.

AYE: [List of Commissioners]
NAY: [List of Commissioners]
ABSENT: [List of Commissioners]
ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat