



GRANT REQUEST FORM (GRF)

A) New Agreement # EPC-19-039 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Tanner Kural		916-327-1542

C) Recipient's Legal Name	Federal ID Number
RePurpose Energy, INC.	82-3886604

D) Title of Project
Reuse of Electric Vehicle Batteries for Solar Energy Storage

E) Term and Amount

Start Date	End Date	Amount
6/30/2020	12/31/2023	\$ 3,000,000

F) Business Meeting Information

ARFVTP agreements \$75K and under delegated to Executive Director

Proposed Business Meeting Date 6/10/2020 Consent Discussion

Business Meeting Presenter Tanner Kural Time Needed: 5 minutes

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

Agenda Item Subject and Description:

REPURPOSE ENERGY, INC. Proposed resolution approving Agreement EPC-19-039 with RePurpose Energy, INC. for a \$3,000,000 grant to install an integrated solar PV energy storage system that incorporates second-life batteries from Nissan EVs at a food co-op in Grass Valley, and adopting staff's determination that this action is exempt from CEQA. The goal of this project is to validate the batteries' ability to integrate solar PV and provide energy resilience to the food co-op. RePurpose Energy will also conduct a series of laboratory-based cycling tests to identify the degradation rate and effective useful life of used EV battery cells.

G) California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?

Yes (skip to question 2)

No (complete the following (PRC 21065 and 14 CCR 15378)):

Explain why Agreement is not considered a "Project":

2. If Agreement is considered a "Project" under CEQA:

a) Agreement **IS** exempt.

Statutory Exemption. List PRC and/or CCR section number: Cal. Public Resources Code § 21080.35

Categorical Exemption. List CCR section number:

Cal. Code Regs., tit. 14, § 15301; Cal. Code Regs., tit. 14, § 15303

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



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Explain reason why Agreement is exempt under the above section: The project involves testing, design, and installation of an integrated solar photovoltaic energy storage system that incorporates second-life batteries from electric vehicles. The testing and manufacturing will take place at an existing laboratory operated by RePurpose Energy in Fairfield, California. The installation will be at the BriarPatch Cooperative in Grass Valley, California.

The solar photovoltaic panels on the rooftop of the BriarPatch Cooperative and on two carports over part of the parking lot, and the rest of the system, are exempt under California Public Resources Code section 21080.35. This statute exempts from CEQA “the installation of a solar energy system on the roof of an existing building or at an existing parking lot” fitting certain characteristics, which this project fits. (For this project, no trees will be removed. Associated equipment will not occupy more than 500 square feet of ground surface, and the site of the associated equipment does not contain plants protected by the Native Plant Protection Act.)

In addition, CEQA exemptions under California Code of Regulations, title 14, sections 15301 and 15303 apply. Section 15301, “Existing Buildings,” covers the operation, maintenance, or minor alteration of existing public or private structures, facilities, mechanical equipment, involving negligible or no expansion of existing or former use. Section 15303, “New Construction or Conversion of Small Structures,” covers construction and location of limited numbers of new, small facilities or structures; and installation of small new equipment and facilities in small structures. The additions of solar PV panels, storage batteries, and ancillary equipment under the grant project fall within these parameters.

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

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

Legal Company Name:	Budget
Electric Power Research Institute, Inc.	\$ 99,600
Gridscape Solutions, Inc.	\$ 825,000
Build Momentum dba Momentum	\$ 325,000
Trustees of the California State University, on behalf of CSU San Jose	\$ 99,999
BriarPatch Cooperative of Nevada County, Inc.	\$ 300,000
California Solar Electric Cooperative Corp.	(part of BriarPatch’s \$300,000)



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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 Number	Amount
EPIC	18-19	301.001F	\$ 3,000,000

R&D Program Area: EGRO: Renewables

TOTAL: \$ 3,000,000

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Ethan Hanohano
 Address: 801 K St Ste 2700, Suite 2700
 City, State, Zip: Sacramento, CA
 95814-3534
 Phone: 916-201-1705
 E-Mail: ethan@buildmomentum.io

2. Recipient's Project Manager

Name: Ben Lyon
 Address: 31 Viejo Vis
 City, State, Zip: Alamo, CA 94507-2640
 Phone: 530-902-7025
 E-Mail: blyon@repurpose.energy

L) Selection Process Used

- Competitive Solicitation Solicitation #: GFO-19-310
 First Come First Served Solicitation Solicitation #:

M) The following items should be attached to this GRF

- | | | |
|---|---|--|
| 1. Exhibit A, Scope of Work | <input checked="" type="checkbox"/> | Attached |
| 2. Exhibit B, Budget Detail | <input checked="" type="checkbox"/> | Attached |
| 3. CEC 105, Questionnaire for Identifying Conflicts | <input checked="" type="checkbox"/> | Attached |
| 4. Recipient Resolution | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |
| 5. CEQA Documentation | <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Attached |

Agreement Manager

Date

Office Manager

Date



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

Deputy Director

Date

Exhibit A Scope of Work RePurpose Energy

TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Laboratory Battery Testing
3	X	Pilot Test of Battery & Behind the Meter PV System
4		Measurement & Verification
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities
7		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
BMS	Battery Management System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
CPUC	California Public Utilities Commission
DER	Distributed Energy Resource
EMS	Energy Management System
EV	Electric Vehicles
IEPR	Integrated Energy Policy Report
kW	Kilowatt
kWh	Kilowatt-hour
PSPS	Public Safety Power Shutoffs
PV	Photovoltaic
RUL	Remaining Useful Life
SoH	State of Health
TAC	Technical Advisory Committee
VoLL	Value of Lost Load

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

A. Purpose of Agreement

The purpose of this Agreement is to fund applied research and development projects that will develop a validated and replicable approach to repurposing retired Electric Vehicle (EV) batteries for stationary energy storage applications (second life EV battery).

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.

Exhibit A

Scope of Work

RePurpose Energy

B. Problem/ Solution Statement

Problem

Repurposing used EV batteries as energy storage for PV systems represents an opportunity to divert waste batteries from disposal and significantly reduce the pending impact on recycling facilities throughout California. Unfortunately, a lack of data on second life battery degradation, performance, and cost have delayed the commercialization of this application. Without validated data, financiers and insurers are unable to effectively calculate risk in order to fund and insure these projects. As a result, used EV batteries are ending up in the waste stream while more lithium-ion batteries are produced to create new energy storage systems.

Solution

The team will conduct a series of laboratory-based cycling tests to identify the degradation rate and effective useful life of individual used EV battery cells based on a variety of control strategies. The team will then create a scale model of a second life EV storage system connected to a grid emulator to validate the optimal control strategy for a solar PV + storage system. Finally, the team will take the learnings from the laboratory testing and deploy a full-scale demonstration installation to collect data on actual system performance. The demonstration site will showcase resiliency and cost benefits to the identified business and local economy. Costs for the second life EV battery will be compared to a similar new lithium-ion battery storage system.

C. Goals and Objectives of the Agreement

The goals of this Agreement are to:

- Characterize the degradation rate of second-life batteries over their lifetime through lab-scale accelerated cycling tests.
- Perform pilot test of technology improvements and operational strategies that optimize the performance, cost, and lifetime of second-life batteries.
- Validate the ability of second-life batteries integrated with solar PV to provide resiliency benefits, electricity bill savings, and increased solar self-consumption for a small to medium-sized commercial building.
- Provide a cost comparison of second life EV batteries to equivalent first use lithium-ion batteries for energy storage.

Ratepayer Benefits:²

The goal of this Agreement is to deliver greater electricity reliability to the host site and its local community by providing backup power in the event of an unplanned outage or public safety power shutoff (PSPS). In 2019, many PG&E customers where the demonstration site is located experienced multiple PSPS events. For its demonstration at a co-op grocery store, the team will deploy on-site renewable generation, second-life batteries, and utilize energy conservation as necessary to maintain the reliability of power during PSPS events. Accordingly, this Agreement

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).

Exhibit A Scope of Work RePurpose Energy

is consistent with the CPUC's Loading Order and has the potential to improve electricity reliability for the host site by hundreds of hours each year.

The site will achieve greenhouse gas reductions via installation of rooftop solar PV and second-life EV batteries. The solar PV and battery system will be designed to reduce energy costs via on-site generation and TOU arbitrage, demand charges via peak load reduction and shifting, and greenhouse gas emissions via reduction in on-peak energy demand. The batteries are expected to further reduce net energy costs via provision of demand response services. The team will subcontract with a local solar installer to deploy the onsite renewable generation and energy storage, thus spurring economic development in a low-income community.

Technological Advancement and Breakthroughs:³

Increased generation of electricity from renewable sources and reduced combustion of petroleum in vehicles are key to achievement of the state's statutory energy goals. However, accelerating solar adoption is creating a need for affordable energy storage, and the cost of energy storage remains a barrier. The project team will improve and validate the cost, performance, and lifetime of second-life batteries when paired with solar PV at a commercial building. The team will evaluate the cost advantage of second-life batteries over new battery alternatives. Accordingly, this Agreement will remove barriers to achievement of SB 100 and SB 32.

Meanwhile, Executive Order B-48-18 calls for at least 5 million zero-emission vehicles on California roads by 2030. The continued adoption of electric vehicles will generate waves of lithium-ion battery waste, which are difficult and expensive to recycle. This Agreement will facilitate diversion of battery waste and deferment of recycling costs by giving EV batteries a second life. One of the main barriers to second-life energy storage systems is the need for extensive cell testing and characterization. This traditionally requires great testing time and expense, which result in erosion of the cost advantage of the used batteries. This Agreement will result in a methodology to quickly and accurately estimate the remaining useful cycle life of a retired EV battery cell in a stationary energy storage system. Furthermore, this Agreement will enable demonstration of a second-life energy storage system consisting of full EV battery packs without disassembly. These approaches have the potential to lower barriers to adoption of energy storage by reducing the time and expense of repurposing EV batteries.

Agreement Objectives

The objectives of this Agreement are to:

- Collect primary data on the degradation rate of second-life EV battery cells under various cycling conditions.
- Deploy a demonstration site to validate the resiliency benefits of second-life batteries to a commercial building and its surrounding community.
- Collect lifecycle cost data on installation of second life EV storage system combined with solar PV and compare to costs of identical new lithium-ion storage system.

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.

Exhibit A

Scope of Work

RePurpose Energy

II. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

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

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product 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 product.
- Submit the revised product 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.

For products that require a final version only

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

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:

- **Electronic File Format**

- Submit all data and documents required as products 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 products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.

Exhibit A Scope of Work RePurpose Energy

- 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 Recipient must also provide the native Microsoft file format.
 - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **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 Recipient 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 Recipient 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 administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

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The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *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 Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

CAM Product:

- 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, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Recipient. 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 Recipient, 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 Recipient, 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 Recipient 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.

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- Submit the CPR Report along with any other *Task Products* 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 products 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 Recipient's input.
- Send the Recipient 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 Recipient 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, products, 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 Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

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

CAM Products:

- 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 Recipient 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 Recipient 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:

Exhibit A Scope of Work RePurpose Energy

- 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 products).
 - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
 - "Surviving" Agreement provisions such as repayment provisions and confidential products.
 - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
 - Prepare a *Schedule for Completing Agreement Closeout Activities*.
 - Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

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

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 Recipient 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.

Products:

- 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

Exhibit A Scope of Work RePurpose Energy

end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient 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 products.)

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

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

Subtask 1.6.2 Final Report

The Recipient 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.

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- 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 receiving the CAM's comments, 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*.

Products:

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

CAM Product:

- 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 Recipient 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 Recipient may spend match funds for this task. The Recipient 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 Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient 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

Exhibit A Scope of Work RePurpose Energy

(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 Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

- If different from the solicitation application, provide 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.

Products:

- 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 Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits 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 Recipient 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*.

Exhibit A Scope of Work RePurpose Energy

- 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.

Products:

- 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 Recipient 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).

Products:

- 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 products and provide recommendations for needed product 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.

Exhibit A Scope of Work RePurpose Energy

- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.

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 Recipient 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.

Products:

- 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 Recipient 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.

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- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

Products:

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

Exhibit A

Scope of Work

RePurpose Energy

III. TECHNICAL TASKS

Products that require a draft version are indicated by marking “(draft and final)” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. **Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.

TASK 2: LABORATORY BATTERY TESTING

The goal of this task is to characterize the performance and degradation rate of second life EV battery cells.

The Recipient shall:

- Develop a *Laboratory Battery Testing Plan* that includes:
 - The number of cells received
 - Variables that will be tested
 - Description of the instrumentation that will be used
 - Methods for analyzing data generated
 - Description of underlying assumptions
 - Expected outcomes
- Receive cells from Nissan
- Apply rapid test cycles to all cells.
- Measure “true” SoH of all cells.
- Determine the ‘grid beneficial’ load profile from EMS and condense the profile for testing
- Determine battery life enhancing EMS load profile and condense the profile for testing
- Determine what acceptable acceleration factors are for selected cell chemistry to avoid changing the aging mechanism.
- Perform accelerated aging with the grid beneficial cycle, stopping to perform SoH checks every 50-100 cycles (depending on how accelerated it is).
- Choose (at least) 3 representative cells to perform non-accelerated aging on for comparison
- Choose a representative sample of cells to be tested with a modified load profile reflecting the BMS/EMS operating adjusted to maximize lifetime.
- Perform accelerated aging on these cells as well,
- Choose (at least) 3 cell to do non-accelerated testing.
- Receive the cell
- Test for initial battery health
- Simulate grid characteristics
- Establish a baseline of degradation rates
- Use critical load analysis
- Submit a *Laboratory Battery Testing Report* describing the outcomes of the testing as described in the *Laboratory Battery Testing Plan*.

Products:

- Laboratory Battery Testing Plan
- Laboratory Battery Testing Report

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TASK 3: DESIGN AND PILOT TEST OF BATTERY & BEHIND THE METER PV SYSTEM

The goal of this task is to design, and pilot test a reliable second-life EV battery system, paired with behind-the-meter solar PV, to demonstrate a technical enhancement for maximizing the battery's useful life while providing resiliency benefits for a small/medium-sized commercial building.

Subtask 3.1: Pilot Site System Design

The goal of this subtask is to conduct all engineering and design activities necessary to finalize the pilot site system design.

The Recipient shall:

- Identify critical loads and quantify total power required to maintain them during a power outage, determine necessary circuit upgrades, controls, and metering to manage these loads.
- Design the PV and battery system, including site integration with site preparation, electrical equipment, control systems, and structural components.
- Design the required site upgrades, including electrical systems, ground preparation, fencing, and integration with existing load controls.
- Provide a *Project Design Report* that shall include, but not be limited to:
 - Summary of the steps taken to reach the final design and final layout.
 - Identification of barriers involved and discuss the steps taken to overcome those barriers.
 - Discussion of the final engineer design and equipment layout for each site.

Products:

- Project Design Report

Subtask 3.2: System Procurement and Site Preparation

This goal of this subtask is to procure equipment, secure all necessary permits, and perform other site preparation activities needed for the pilot site.

- Procure equipment by:
 - Discussing equipment, electrical, and installation requirements with qualified vendors.
 - Finalizing equipment specification.
 - Issuing bid documents.
 - Reviewing responses.
 - Selecting vendors.
 - Placing equipment orders.
- Secure all permits needed for installation of all equipment, consistent with Task 1.8.
- Prepare proposed locations at the site for installation of the new equipment. Steps include:
 - Preparing the installation timeline
 - Identifying drop sites for new equipment.
 - Accept delivery of new equipment at chosen site(s).
- Provide a *Site Preparation and Equipment Procurement Report* that shall include, but not be limited to:
 - Summary of the steps to prepare the site(s);

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- Copy of the performance specifications for each equipment purchased by the grant.
- Summary of the bids received and from whom.
- Copies of all required permits needed for installation at each site.
- Copies of the final procurement documents and purchase orders; and
- Status of the planned installation including preliminary schedule for equipment delivery and installation for each site.

Products:

- Site Preparation and Equipment Procurement Report

Subtask 3.3: System Installation and Commissioning

The goal of this subtask is to install and commission the solar PV and second-life battery storage system at the pilot site.

- Execute installation of the project as outlined in the installation timeline and equipment list. Install each piece of equipment or group of equipment as follows:
 - Prepare drop sites as required
 - Shut down plant processes as required
 - Install new equipment
 - Install Measurement and Verification (M&V) meters and equipment
 - Conduct pre-startup safety review
 - Perform cold commissioning, which will include:
 - Completion and system check out
 - Confirmation of operational readiness
 - Perform hot commissioning, which will include:
 - Performance testing of new systems
 - Performance testing of integration with existing energy management and control systems
 - Performance test run of new system
 - Optimize system performance in response to testing in order to meet stated performance specification
- Provide an *Equipment Installation Report* that shall include, but not be limited to:
 - Summary of the equipment installation requirements for each demonstration site;
 - Identification of barriers involved during installation and discuss the steps taken to overcome those barriers;
 - Discuss results of equipment start-up and commissioning at each site with respect to whether the equipment as installed meets the stated performance specifications.
- Submit CRP Report #1 and participate in a CRPR meeting per subtask 1.3.

Products:

- Equipment Installation Report
- CPR Report #1

TASK 4: MEASUREMENT & VERIFICATION

The goal of this task is to assess the benefits of the Task 3 Pilot Test of Battery & Behind the Meter PV System.

The Recipient shall:

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- Submit the *Measurement & Verification Plan* that outlines how the following performance indicators and metrics will be quantified and reported, at a minimum:
 - Benefits to electricity ratepayers.
 - Current state of technology.
 - Anticipated advancements and breakthroughs.
 - Reliability, resiliency and sustainability improvements provided by the energy storage system.
 - Net impacts on the end customer or larger grid's load provided by the energy storage system.
 - GHG reductions provided by the energy storage system, compared to using the utility grid for the electricity, also GHG reductions as provided by the operation of the proposed energy storage system" for GHG intensity factors.
 - The projected dollar value of energy savings as provided by the energy storage system on a monthly-hourly-average basis.
 - The dollar value of any co-benefits that may accrue to the project on an annual or more granular basis.
 - Cost savings or increases compared to business as usual (defined by previous year's electricity bills), provided by the energy storage system and over the grant period. This includes technology and installation costs, operations and maintenance, and energy use.
 - Projected benefit metrics for the energy storage system as being applied in the proposed application or use case that identifies the different value streams provided, how they will be measured, the expected value and any actual data to be collected and reported.
 - Analysis of expected versus actual performance based on performance data (with five-minute or shorter time intervals) for the energy storage system and any other pre-commercial components that are being tested.
 - Measurement and modeling methodology of degradation data for the second life EV battery.
 - Verification that the second life EV battery can operate reliably under a control strategy that maximizes self-utilization of solar PV generation and supports grid needs (e.g., responding to utility time-of-use rates and demand response signals, reducing demand charges).
 - Compare cost and performance data to an equivalent new off-the-shelf stationary battery.
 - Assess the second-life battery's potential market price compared to the cost of equivalent new stationary battery, with the goal of being as cost-competitive as possible.
 - Identify potential opportunities for further reducing repurposing costs through future research.
 - Calculate the minimum Value of Lost Load (VoLL) needed to cover the difference between the cost and benefit of the DER system over its lifetime, assuming an annual outage duration of 24 hours per year (or an annual outage event equal to the maximum duration able to be supported by the DER system). Compare this break-even VoLL with the actual VoLL of the business.
 - Instrumentation used to collect data.

- Implement the *Measurement & Verification Plan* and submit a *Measurement & Verification Report* detailing the findings.

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- Submit CRP Report #2 and participate in a CRPR meeting per subtask 1.3.

Products:

- Measurement & Verification Plan
- Measurement & Verification Report
- CPR Report #2

TASK 5: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
 - Additional Information for Product Development Projects:
 - Outcome of product development efforts, such copyrights and license agreements.
 - Units sold or projected to be sold in California and outside of California.
 - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
 - Investment dollars/follow-on private funding as a result of Energy Commission funding.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Additional Information for Product Demonstrations:
 - Outcome of demonstrations and status of technology.
 - Number of similar installations.
 - Jobs created/retained as a result of the Agreement.

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- For Information/Tools and Other Research Studies:
 - Outcome of project.
 - Published documents, including date, title, and periodical name.
 - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
 - The number of website downloads.
 - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
 - An estimate of energy and non-energy benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

TASK 6: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.

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- A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
- The number of website downloads or public requests for project results.
- Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

TASK 7: Production Readiness Plan

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

The Recipient shall:

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
 - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
 - Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
 - The estimated cost of production.
 - The expected investment threshold needed to launch the commercial product.
 - An implementation plan to ramp up to full production.
 - The outcome of product development efforts, such as copyrights and license agreements.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Other areas as determined by the CAM.

Products:

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RePurpose Energy**

- Production Readiness Plan (draft and final)

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: REPURPOSE ENERGY, 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 EPC-19-039 with **RePurpose Energy, INC.**, for **\$3,000,000**, to install an integrated solar photovoltaic (PV) energy storage system that incorporates second-life batteries from Nissan Electric Vehicles (EVs) at a food cooperative (co-op) in Grass Valley. The goal of this project is to validate the batteries' ability to integrate solar PV and provide energy resilience to the food co-op. RePurpose Energy will also conduct a series of laboratory-based cycling tests to identify the degradation rate and effective useful life of used EV battery cells; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her 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 June 10, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat