



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC-20-038(to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Rhetta deMesa	43	916-628-1640

C) Recipient's Legal Name	Federal ID Number
MOEV Inc.	46-5435163

D) Title of Project
Artificial Intelligence Based Heavy-Duty Fleet Charging to enable Distributed Energy Resource Integration

E) Term and Amount

Start Date	End Date	Amount
6/1/2021	11/30/2024	\$ 3,319,387

F) Business Meeting Information

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

Proposed Business Meeting Date 5/12/2021 ☐ Consent ☒ Discussion

Business Meeting Presenter Rhetta deMesa Time Needed: 5 minutes

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

Agenda Item Subject and Description:**MOEV Inc.**

MOEV Inc. Proposed resolution approving Agreement EPC-20-038 with MOEV Inc. for a \$3,319,387 grant to demonstrate an artificial intelligence based fleet charging management system with DERs including electric transit buses, charging stations, a battery energy storage system, and solar PV, and adopting staff's determination that this action is exempt from CEQA. The demonstration will be used to evaluate the potential for the artificial intelligence charging management system to optimize the management of DERs to reduce costs, increase the use of renewable energy sources, and provide grid resilience.

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:

☒ 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 will include the replacement of existing utility facilities and installation of the photovoltaic panels which will involve negligible or no expansion of capacity.

- 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
Operation Technology, Inc.	\$ 99,000
Lawrence Berkeley National Laboratory	\$ 300,000
TBD Electrical Contractor	\$ 260,000
South Bay Cities Council of Governments	\$ 15,000
IIT Alumni Association of Southern California	\$ 50,000
	\$
	\$
	\$
	\$
	\$

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

Legal Company Name:



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J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	20-21	301.001H	\$3,319,387
			\$
			\$
			\$
			\$
			\$

R&D Program Area: EGRO: Renewables

TOTAL: \$ 3,319,387

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information**1. Recipient's Administrator/Officer**

Name: Hermanshu Pota

Address: 907 Westwood Blvd Ste
420City, State, Zip: Los Angeles, CA
90024-2904

Phone: 470-765-6638

E-Mail: info@moevinc.com

2. Recipient's Project Manager

Name: Peter Chu

Address:

City, State, Zip: ,

Phone: 310-650-5272

E-Mail: pchu@moevinc.com

L) Selection Process Used☒ Competitive Solicitation Solicitation #: GFO-20-304☐ First Come First Served Solicitation Solicitation #:☐ Non-Competitive Bid Follow-on Funding (SB 115)**M) The following items should be attached to this GRF**

1. Exhibit A, Scope of Work

☐ Attached

2. Exhibit B, Budget Detail

☐ Attached

3. CEC 105, Questionnaire for Identifying Conflicts

☐ Attached

4. Recipient Resolution

☐ N/A☐ Attached

5. CEQA Documentation

☐ N/A☐ Attached

Agreement Manager

Date

Office Manager

Date



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Deputy Director

Date

CALIFORNIA ENERGY COMMISSION

Exhibit A Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Site Survey, System Engineering Design and Use Case Development
3	X	Equipment Acquisition and Construction Planning
4		Construction, System Deployment, and Testing
5		Demonstration, Validation, Improvement and Maintenance
6		Data Collection and Analysis
7		Community Outreach and Education
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AI	Artificial Intelligence
BEB	Battery Electric Bus
BESS	Battery Energy Storage System
BMS	Battery Management System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CAPEX	Capital Expenses
CEC	California Energy Commission
CPR	Critical Project Review
DER	Distributed Energy Resources
DR	Demand Response
EV	Electric Vehicle
FCMS	Fleet Charging Managing System
GHG	Greenhouse gas
GVWR	Gross Vehicle Weight Rating
MDHD	Medium Duty and Heavy Duty
ML	Machine Learning
OPEX	Operating Expenses
PV	Solar Photovoltaic
TAC	Technical Advisory Committee
TOU	Time of Use electricity pricing

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

A. Purpose of Agreement

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

The purpose of this Agreement is to fund the demonstration of an integrated Distributed Energy Resources (DER) smart charging platform, and evaluate the potential of efficiently supporting electric vehicle (EV) charging infrastructure for medium-duty and heavy-duty (MDHD) zero-emission transit bus fleets.

B. Problem/ Solution Statement

Problem

Electrification of large weight-class vehicles such as heavy-duty buses is challenging and costly due to high-power charging needs, demanding duty cycles, and large amounts of energy required. This results in a high cost of electrification to transit fleet operators due to up-front electric infrastructure (CAPEX) and higher operating expenses (OPEX). The costs of both OPEX and CAPEX have proven to be a significant hurdle in transportation electrification broadly, however, these expenses are more pronounced in MDHD applications where higher power requirements are needed. To accelerate electrification of public transport, there needs to be a better understanding of the drivers behind the total cost of operation and solutions to make electrification of these MDHD fleets more economically viable. Also, installing charging infrastructure for heavy duty vehicles in urban locations where space is already at a premium continues to be a challenge. Further, as transportation electrification is accelerated, it becomes even more critical that we continue to decarbonize the electric grid to realize the full benefits of transitioning these fleets to electric.

Solution

The Recipient's solution is an Artificial Intelligence (AI)-driven smart charging platform that creates a behind-the-meter DER control system to achieve the goals of the project. The technology is intended to optimize cost and resiliency, and maximize renewable integration using the Recipient's AI-based Fleet Charging Managing System (FCMS) by integrating key DERs assets behind the meter that include: Battery Electric Bus (BEBs), chargers, battery storage and solar photovoltaic (PV), for a MDHD fleet electrification application.

Firstly, this technology uses AI based machine learning (ML) to estimate energy consumption for each BEB using as input metering data from EV chargers in combination with telematics based variables such as vehicle weight, driving route and speed, ambient temperature, and grade, in order to optimize energy transfer between the DER assets behind the meter. Fleet vehicles being parked overnight also allow a charging port to be multiplexed and shared by multiple vehicles, thereby reducing operating space and the cost of installing additional charging ports. Secondly, ML prediction based on history of the charging profile with time as well as the history of fleet operations, in combination with real-time data, modifies charging schedules to optimize around Time of Use (TOU) pricing and simultaneously reduces peaks by shifting charging to non-peak time slots so as to minimize utility demand charges - thus lowering the electric bill. Further, the system collates charging sessions to maximize the amount of renewable generation being used. Integrating with the key DER assets behind the meter also enables the integrated DER solution to provide grid resiliency using a combination of peak load reduction, and load shifting and shaping to support demand response (DR) needs of the grid. Finally, this demonstration will include the use of AI-driven software to manage the charging ports, vehicles, battery energy storage system (BESS), and renewable generation system, thereby providing an optimum benefit to all participating stakeholders using the DER design and integration.

C. Goals and Objectives of the Agreement

Exhibit A

Scope of Work

Agreement Goals

The goals of this Agreement are to:

- Reduce greenhouse gas (GHG) emissions from the bus fleet – GHG emissions will be reduced by replacement of internal combustion engine buses with BEBs in the fleet in combination with using local solar PV generation to provide electricity to the BEBs.
- Maximize the utilization of renewable energy source – By performing AI-based smart management of charging in combination with Solar PV and BESS, the project will demonstrate how to maximize the utilization of solar to fuel the BEBs.
- Lower the overall charging costs - The AI and ML based approaches utilized in this project lower the peak load for charging BEBs, thereby lowering demand charges, and in turn reducing overall charging costs.
- Provide resiliency by demonstrating a smart charging platform that enables quick replicability and scalability for MDHD electric vehicle fleets – The MOEV software will integrate DERs including EV chargers, solar photovoltaic (PV) on-site generation and a battery energy storage system (BESS) using MOEV AI™, to manage these energy assets when the utility requests load curtailment via demand response (DR). This enables the resiliency goals of the project.

Ratepayer Benefits:² This Agreement is intended to result in ratepayer benefits including greater electricity reliability and lower costs by deploying the Recipient's smart charging technology combined with the integration of DERs to enable flexible support capability of the grid. The Recipient's innovative AI based ML technology is designed to optimize management of MDHD EV charging to minimize OPEX and maximize the utilization of existing infrastructure, reducing CAPEX. An integrated DER approach using our AI system provides a flexible support capability for the grid.

The Recipient software integrates DERs including solar PV on-site generation and a BESS using Recipient's MOEV AI™, which can effectively manage these energy assets, creating flexibility to shift loads based on utility signals and current grid needs. The demonstration site can respond rapidly to utility signals by relying on its own local generation or storage or even shifting when a vehicle is being charged, resulting in a more resilient and reliable grid. By participating in DR programs, the DER integrated AI solution enables lowering the peak loads for the grid operators, who can then pass on the savings to consumers. Finally, the ability to add greater amounts of renewables, solar in this instance, helps grid operators solve the CAISO reported solar duck phenomenon thereby further lowering the cost of electricity since solar is now cheaper than most fossil fuel based sources, resulting in cheap yet clean energy for the ratepayers.

Technological Advancement and Breakthroughs: This Agreement is intended to lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's energy goals. In particular, the California renewable portfolio standard requires that 60% of retail sales of electricity in California come from eligible renewable resources by 2020 and 100% come from eligible renewable and zero-carbon resources by 2045. Barriers to achieving these goals include high cost of managing the grid with more renewables, challenges

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

associated with the intermittency of renewables including the added complexity of having a resilient grid that is dynamically controllable. In response to this need, the Recipient proposes a technology development and demonstration project to evaluate cost management, resilience, and renewable integration using the Recipient's MOEV AI™- the company's AI-based FCMS with integrated DERs including EVs, chargers, battery storage and PV, for a MDHD fleet electrification application.

The Recipient combines two key technologies which when demonstrated and deployed together with BEBs will result in substantial breakthrough, as follows:

1) Multiplexing – Multiplexing is a patented technology being commercialized by the Recipient in which a single circuit is connected to multiple charge ports enabling multiple vehicles to be charged simultaneously and dynamically controlled with different levels of power in each vehicle^{3, 4, 5}. This current sharing control is performed via the MOEV Internet Cloud AI software that performs smart EV charging management and is based on the individual mileage needs of the vehicle. This multiplexing approach has on average been shown to deliver 2.8 times more charging sessions and 1.5 times more energy delivered than conventional level 2 EV chargers^{6, 7} for a quad charger (four outlets per charger) thereby minimizing the need for capacity upgrades and reducing CAPEX both for the utility and the site.

2) AI based peak minimization: the Recipient has developed AI software architecture that utilizes data, both historical and real time, from the EV chargers, from an app used by the driver, from telematics data in the vehicle, and from weather and traffic information in combination with electricity pricing from the utility to first predict energy consumption by each individual EV and then to control when the EV is charged or discharged. This control using AI-based ML is done with the objective to minimize peak load via our smart charge algorithms, resulting in a modified charging profile, thereby minimizing demand charges and reducing OPEX. It is the combination of (1) and (2) that results in the breakthrough in EV charging that helps California to reach its statutory energy goals.

Agreement Objectives

The objectives of this Agreement are to:

- Design and deploy an AI-driven smart charging platform which integrates DERs for charging a BEB Transit Fleet and includes BESS, on-site PV, and electric vehicle chargers.
- Demonstrate and validate project benefits in energy cost savings, GHG reduction, peak load reduction and ensuing demand charge reduction, DR, increase in renewables achieved with AI-based DER approach, and enhanced grid resilience capability.

³ R. Gadh, C. Chung, C. Chu, and L. Qiu, "Power Control Apparatus and Methods for Electric Vehicles", US9290104 B2, Aug. 24, 2013. (GRANTED)

⁴ R. Gadh, C. Chung, L. Qiu, and C. Chu, "Network Based Management for Multiplexed Electric Vehicle Charging", US9620970B2, Nov. 30, 2011. (GRANTED)

⁵ R. Gadh, S. Mal, S. Prabhu, C. Chu, J. Panchal, O. Sheikh, C. Chung, L. He, B. Xiao, and Y. Shi, "Smart Electric Vehicle (EV) Charging and Grid Integration Apparatus and Methods," US9026347B2, Jun. 10, 2010. (GRANTED)

⁶ "Next Generation of Storage - Virtual Battery", MOEV CALSEED Project final Report, October, 2019.

⁷ "Demonstrating Plug-in Electric Vehicles Smart Charging and Storage Supporting the Grid" Final Project Report, August 2018, <https://ww2.energy.ca.gov/2018publications/CEC-500-2018-020/CEC-500-2018-020.pdf>
"Next Generation of Storage - Virtual Battery", MOEV CALSEED Project final Report, October, 2019.

Exhibit A

Scope of Work

Exhibit A Scope of Work

TASK I 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)**. All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations. All technical tasks should include product(s). 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 California Energy Commission’s (CEC) 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.

The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

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- 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.
- 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 CEC'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 CEC 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;
- Invoicing and auditing procedures;
- 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

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- Any other relevant topics.

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 (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide *Kick-off Meeting Presentation* to include but not limited to:
 - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
 - Project schedule that identifies milestones
 - List of potential risk factors and hurdles, and mitigation strategy
 - Provide an *Updated Project Schedule*, *Match Funds Status Letter*, and *Permit Status Letter*, 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:

- Kick-off Meeting Presentation
- Updated Project Schedule (*if applicable*)
- Match Funds Status Letter (subtask 1.7) (*if applicable*)
- Permit Status Letter (subtask 1.8) (*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 CEC 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 CEC 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 CEC.

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 CEC, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

Exhibit A

Scope of Work

The Recipient shall:

- Prepare and submit 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.
- 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* with 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)

CAM Products:

- CPR Agenda
- 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 CEC 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:
 - Disposition of any procured equipment.
 - The CEC's request for specific "generated" data (not already provided in Agreement products).

Exhibit A

Scope of Work

- 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 copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Final 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 Funds 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. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC 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 *Energy Commission Style Manual* provided by the CAM.

Exhibit A

Scope of Work

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Energy Commission 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, Energy Commission 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)
- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
 - Comments the recipient proposes to incorporate.
 - Comments the recipient does propose to incorporate and an explanation for why.
- 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.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised *Final Report* electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments
- Draft Final Report
- Written Responses to Comments (*if applicable*)

Exhibit A Scope of Work

- 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 CEC 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 CEC 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 CEC 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 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

Exhibit A

Scope of Work

- 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*.
- 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.

Exhibit A

Scope of Work

- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each 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.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- 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.

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;

Exhibit A

Scope of Work

- 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.
- 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 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.

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- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

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

Subtask 1.12 Project Performance Metrics

The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:

- Complete and submit the project performance metrics from the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
 - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
 - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

Exhibit A

Scope of Work

III. TECHNICAL TASKS

TASK 2 SITE SURVEY, SYSTEM ENGINEERING DESIGN AND USE CASE DEVELOPMENT

The goals of this task are to 1) produce the engineering design of a feasible and efficient DER system to support the BEB charging infrastructure for the transit bus fleets and 2) develop use cases for technology demonstrations. The DERs includes solar panels (PV), BESS and electric vehicle chargers that charge BEBs. This task will be carried out through the following subtasks.

Task 2.1 System Engineering Design and Capacity Planning

The goal of this task is to design the parameters and configuration of the EV infrastructure composed of a battery storage system, solar PV system, charging stations, and power electronic converters, along with the capacity planning of the battery storage system.

The Recipient shall:

- Conduct distribution feeder hosting capacity analysis
- Conduct load analysis based on BEB operation and charging behavior
- Conduct power generation analysis for the Solar PV system
- Consider design factors that can contribute to the resilience of charging station infrastructure in terms of safety, robustness, rapid recovery, and adaptability
- Prepare the *System Engineering and Resilience Design Report* which shall include a summary of processes completed for the activities described above

Products:

- System Engineering and Resilience Design Report

Task 2.2 Characterization of Travel Behaviors and Energy Utilization of the MDHD EVs

The goal of this task is to understand the travel and energy consumption characteristics of the MDHD EVs being studied in this project via site survey and data analytics. The data would include the 1) key parameters of the MDHD fleet, e.g., fleet sizes, gross vehicle weight rating (GVWR) rating of each vehicle and electrified powertrain parameters, such as rated efficiency, battery size, etc., 2) detailed operation data with specific duty-cycle info that include GPS locations and speed values with regular timestamps, and 3) MDHD fleet operation timetables that specify the routes and schedules of each trip on different weekdays.

The Recipient shall:

- Model the MDHD fleet and the vehicle specifications using the existing software tool, HEVI-LOAD (previously called HEVI-PRO), developed by Lawrence Berkeley National Laboratory (LBNL) for medium- and heavy-duty electric vehicle charging infrastructure projection
- Quantify the energy consumption per trip by each vehicle using the GPS location data and conduct uncertainty quantification of the trip energy needed with respect to different driving patterns
- Produce a *Fleet Characteristics and Energy Consumption Quantification Report* that summarizes the fleet characteristics and energy consumption quantification of the MDHD EV fleets for different driving patterns

Products:

- Fleet Characteristics and Energy Consumption Quantification Report

Exhibit A

Scope of Work

Task 2.3 Charging Demand Forecast for Electrified Transit Fleet Using Data-driven Approaches

The goal of this task is to estimate the charging demand and load profiles of the MDHD EV fleet under a variety of scenarios. Using the agent-based simulation capability of the HEVI-LOAD tool, being developed by the subcontractor and the historical GPS location data, the Recipient will develop multiple charging scenarios and determine the time-dependent fleet charging load profiles.

The Recipient shall:

- Process the historical trip statistics and the derived energy consumption values
- Build predictive models to estimate the number of MDHD fleet trips, charging schedules, and energy demands under multiple circumstances that include varying penetration of EVs in fleets
- Determine the corresponding charging load profiles under different scenarios using the agent-based simulation tool
- Produce a *Predictive & Forecasting Models and The Charging Load Profiles Report* on the predictive & forecasting models and the projected charging load profiles under a variety of scenarios

Products:

- Predictive & Forecasting Models and The Charging Load Profiles Report

Task 2.4 DER with EV Package Simulation

The goal of this task is to conduct DER integration simulation. DER integration makes the existing distribution grid into a smart grid. EVs need significant power. Moreover, California has its own standard and grid code for DERs. Therefore, modeling and simulation studies are needed for proper operation, safety, optimization and planning.

The Recipient shall:

- Model Battery Management System (BMS) and cell level EV battery chemistry to demonstrate 1) Constant Current vs. Constant Voltage charging-discharging cycles, 2) Aging and temperature effects
- Investigate DER interconnection studies to check under voltage, overloading, protection, and relay coordination of SCE local feeders
- Determine optimum size and location of DER and EV charging stations
- Test and validate design considering DER standards for California, e.g., California Rule 21, IEEE 1547
- Prepare a *DER Simulation Report* containing but not limited to power flow, short circuit, relay coordination, optimum size and location, verification and validation procedure, and ETAP simulation results

Products:

- DER Simulation Report

Task 2.5 Use Case Development

The goal of this task is to develop use cases for data collection, demonstrations, and performance matrix validations.

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Scope of Work

The Recipient shall:

- Develop use cases for each demonstration. The use cases will be categorized into the following 3 areas: Cost management, Resilience and Renewable integration.
- Identify actors, trigger, preconditions, normal flow, alternate flow, exceptions, post-conditions, and success criteria
- Identify baseline data set and use case data set to be collected
- Produce a *Use Cases and Demonstration Plan Report* that describes each case and planned demonstrations.

Products:

- Use Cases and Demonstration Plan Report (draft and final)

TASK 3 EQUIPMENT ACQUISITION AND CONSTRUCTION PLANNING

The goals of this task are to produce a feasible construction plan and to start the process of equipment acquisition.

The Recipient shall:

- Identify and select electric construction subcontractor(s) for the installation of PV, BESS and EV chargers.
- Obtain quotes and begin the acquisition process of selected equipment including PV, BESS and EV chargers, and electric buses.
- Prepare schematic drawings and construction scheduling and submit them for building, construction and electric permits.
- Obtain required permits in a timely manner according to Task 1.8
- Prepare a *Construction Schedule and Planning Report* which will include but are not limited to schematic drawings of the system, construction scheduling, equipment specifics.
- Prepare *CPR Report*

Products:

- Construction Schedule and Planning Report
- CPR Report

TASK 4 CONSTRUCTION, SYSTEM DEPLOYMENT, AND TESTING

The goal of this task is to install, deploy and test the proposed smart charging platform with integration of PV and BESS.

The Recipient shall:

- Work with electric subcontractor(s), GTrans fleet operations, GTrans facility management to begin system deployment.
- Prepare and deploy hosting server(s) and software applications that allow web and database server to bring installed PV, BESS and EV chargers online.
- Test and verify the monitoring and/or control functions of the installed components.
- Test and verify AI based-smart charging algorithm software and BESS operations as new installations are added to the EV charging network.
- Prepare *Monthly Progress Reports* in accordance with Task 1.5 to report progress on the installation and commissioning tasks after construction begins.

Exhibit A

Scope of Work

Products:

- Construction Progress Report

TASK 5 DEMONSTRATION, VALIDATION, IMPROVEMENT AND MAINTENANCE

The goal of this task is to demonstrate, improve, and validate the deployed smart EV charging platform to make sure it is in-line with achieving the proposed performance criteria of this project.

Task 5.1 Optimal Sizing of Charging Stations to Support MDHD Vehicle Electrification

The goal of this task is to determine the optimal configuration of chargers for the site being studied, including the charger types, power ratings, and the number of plugs per charger. The subcontractor team will develop optimization-based approaches to derive the optimal configuration for the currently proposed demonstration, and after installation, via data collected for scaling up the solution to larger number of BEBs, considering the travel usage patterns and the onsite renewable generation profiles.

The Recipient shall:

- Develop optimization-based approaches to determine the best charging infrastructure configurations that maximize the charger accessibility to the MDHD fleet and minimize the capital investment in the long term, considering the tariff structures, renewable generation profiles, and the MDHD fleet usage patterns.
- Compare different charging infrastructure configurations and evaluate the cost-effectiveness of deployment plans
- Produce a report, *Optimal Charging Infrastructure Configuration Plans*, on the development of optimal charging infrastructure configuration plans given the MDHD fleet usage patterns charging demand, and renewable generation.

Products:

- Optimal Charging Infrastructure Configuration Plans Report

Task 5.2 Optimal Operation of High-Power Chargers with Co-located DERs

The goal of this task is to develop effective control methods and energy management strategies for the high-power chargers being deployed to support the MD/HD EV operations. A number of factors will be considered to determine the optimal charge and DER operation strategies, including the time-of-use energy prices, demand charges, hourly renewable energy generations and forecasts as well as local power grid constraints, such as the circuit capacity values. The developed control methods will be validated using the agent-based simulation capabilities within the HEVI-LOAD tool developed by the subcontractor.

The Recipient shall:

- Develop charger control methods and inverter control methods in order to minimize the operation cost and maximize the renewable generation for the site
- Extend the existing agent-based simulation capability within the HEVI-LOAD to support a case study for the site being studied in this project, including the detailed vehicle activities simulation, power flow analysis for the local distribution grid, and additional modules for renewable generations and operation cost estimation.
- Validate the charger control and DER management strategies within HEVI-LOAD simulations against the real-world measurement data collected by site operators.

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- Prepare a *Charger Control and DER Energy Management Report* on the charger control and DER energy management methods developed along with simulation and validation results.

Products:

- Charger Control and DER Energy Management Report

Task 5.3 Validate Operational Feasibility

The goal of this task is to ensure the DER package design matches fleet operational duty cycle (DC) characteristics. Every fleet has unique operating characteristics (time of day, seasonality, hours of operation, variation in daily work demand, average distance, speed and payload, kinetic intensity, miles per stop, etc.). For a successful demonstration, the DER package design must support and match fleet operations.

The Recipient shall:

- Define and document the fleet operating duty cycle:
 - Identify key factors for fleet operations
 - Document duty cycle statistics for key factors
- Compare fleet duty cycle to solution alternatives:
 - Match DER package design to fleet operation
 - Identify areas of concern (AOCs) impacting likelihood of operational success
- Develop an *Operational Feasibility Report* including the following:
 - Fleet Operating Duty Cycle(s)
 - Document AOCs
 - Identify strategies to address AOCs

Products:

- Operational Feasibility Report

Task 5.4 Demonstration and validation of project benefits

The goal of this task is to demonstrate and validate the targeted project benefits by examining the system performance criteria proposed in Task 1.12.

The Recipient shall:

- Continue to collect operational data and perform preliminary data analysis and compare with proposed project performance criteria.
- Determine relevant modifications of ML algorithms in the AI system based on learnings from real-time and historical data gathered to scale up to commercial grade systems.
- Maintain and service components of the EV smart charging platform to uphold normal operation and continuous data collection.
- Host technology demonstration for invited visitors from other transit fleets to showcase the EV smart charging platform deployed in this project.
- Prepare a *Demonstration and Preliminary Project Benefit Validation Report* which will include but is not limited to the preliminary benefit evaluation, prediction of meeting the proposed performance criteria and demonstration outcome.

Products:

- Demonstration and Preliminary Project Benefit Validation Report

Exhibit A

Scope of Work

TASK 6 DATA COLLECTION AND ANALYSIS

The goal of this task is to collect operational data from the project, to analyze that data based on the demonstrations and use cases developed in Task 2.4. and to include the analysis result in the Final Report.

The Recipient shall:

- Collect baseline data which will include vehicle utilization, charging energy, bus routes, charging schedules, charging power profile, operational cost, energy cost, vehicle models, vehicle battery capacity, electric utility tariff, and TOU pricing.
- Collect 12 months of data based on the use cases and demonstrations which may include but not limited to peak power, duration of active charging, arrival and departure time of the vehicle, energy delivered, PV generation, BESS charging and discharging sessions, and demand charge mitigation.
- Conduct data analysis and provide best practice scenarios for future technology replicability and scalability
- Prepare a *Use Case Data Collection and Analysis Report* that compares project performance and expectations using performance matrix and use case defined.

Products:

- Use Case Data Collection and Analysis Report

TASK 7 COMMUNITY OUTREACH AND EDUCATION

The goal of this task is to perform engagement and provide outreach and education to the neighborhood community residents about the benefits of electric power mobility – lower pollution, lower cost of electricity, less noise from electric transportation, increased clean energy in the grid, a more reliable electric grid, and reducing climate change.

The Recipient shall:

- Identify outreach and educational goals, target populations, venues and modes of communication in the transit service area
- Identify and compile a list of Community-Based Organizations (CBOs) and public sector agencies, establish Outreach Contact Database, Outreach/Education Calendar, Coordinate and schedule Outreach Events and create an Outreach/Education Solicitation Matrix
- Adapt educational and public relations materials to the community needs
- Organize events suitable to the community to engage them, learn from them, and educate and inform them of the benefits of the project
- Track and estimate the number of people impacted by the overall project in the immediate term of the project and as the project scales up to full electrification in the future.
- Prepare a *Gardena Community Outreach Report* that presents the results of the
- community-based organization work performed including estimates of the number of people impacted, CBO and Public Sector Outreach Database, Outreach/Education, Solicitation Matrix, Outreach/Education Calendar

Products:

- Gardena Community Outreach Report

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TASK 8 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete the *Initial Project Benefits Questionnaire*. The *Initial Project Benefits Questionnaire* shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by December 15th of each year. The Annual Survey includes but is not limited to the following information:
 - Technology commercialization progress
 - New media and publications
 - Company growth
 - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The *Final Project Benefits Questionnaire* shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 9 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to ensure the technological learning that resulted from the demonstration(s) is captured and disseminated to the range of professions that will be responsible for future deployments of this technology or similar technologies.

The Recipient Shall:

- Develop and submit an *Initial Project Case Study Plan (Draft/Final)* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The *Initial Project Case Study Plan* should include:
 - An outline of the objectives, goals, and activities of the case study.
 - The organization that will be conducting the case study and the plan for conducting it.

Exhibit A

Scope of Work

- A list of professions and practitioners involved in the technology's deployment.
- Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners.
- Presentations/webinars/training events to disseminate the results of the case study.
- Present the *Draft Project Case Study Plan* to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the *Draft Project Case Study Plan*. This document will identify:
 - TAC comments the recipient proposes to incorporate into the *Final Technology Transfer Plan*.
 - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the *Final Project Case Study Plan* to the CAM for approval.
- Execute the *Final Project Case Study Plan* and develop and submit a *Project Case Study Report (Draft/Final)*
- When directed by the CAM, develop presentation materials for an CEC- sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California CEC.
- 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.

Products:

- Project Case Study Plan (Draft/Final)
- Summary of TAC Comments
- Project Case Study Report (Draft/Final)
- High Quality Digital Photographs

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: MOEV 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-20-038 with MOEV Inc. for a \$3,319,387 grant to demonstrate an artificial intelligence based fleet charging management system with DERs including electric transit buses, charging stations, a battery energy storage system, and solar PV. The demonstration will be used to evaluate the potential for the artificial intelligence charging management system to optimize the management of DERs to reduce costs, increase the use of renewable energy sources, and provide grid resilience; 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 May 12, 2021.

AYE:

NAY:

ABSENT:

ABSTAIN:

Patricia Carlos
Secretariat