



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC-21-014 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Joshua Croft	51	925-452-7638

C) Recipient's Legal Name	Federal ID Number
Intertie Incorporated	35-235 35-2569628

D) Title of Project
Advanced Power Electronics to Enable Fast Charging While Avoiding Grid Upgrades

E) Term and Amount

Start Date	End Date	Amount
1/30/2022	3/31/2027	\$ 2,000,000

F) Business Meeting Information

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

Proposed Business Meeting Date 1/26/2022 ☐ Consent ☒ Discussion

Business Meeting Presenter Joshua Croft Time Needed: 5 minutes

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

Agenda Item Subject and Description:**INTERTIE INCORPORATED.**

Proposed resolution approving Agreement EPC-21-014 with Intertie Incorporated for a \$2,000,000 grant to design, develop and build an advanced power electronics module (PEM) that enables a commercially available fast charger to supply high power to EVs to allow ultra-fast charging to be deployed quickly at almost any location, and adopting staff's determination that this action is exempt from CEQA. The project team shall directly connect a fast charger to energy storage and solar resources using the PEM to validate the improved energy efficiencies and reduced operating costs realized from the direct current-coupling technology. Contact: Joshua Croft. (Staff Presentation: 5 minutes).

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, 15303, 15306

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

**GRANT REQUEST FORM (GRF)**

Explain reason why Agreement is exempt under the above section:

This project involves the design, building, and testing of a module that will enable an electric vehicle (EV) fast charger to supply high power to EVs while decoupling the charger from the grid. The project will take place at an existing facility and will require minor modifications to the facility such as the addition of a fast charger for testing and electrical wiring modifications. All modifications will be made according to standard safety practices and in conformance with any applicable regulations. These modifications involve negligible or no expansion of existing or former use at the site. Testing of the module will involve comprehensive data collection, modeling and system performance verification.

This project is therefore categorically exempt from environmental review pursuant to section 15301 of the CEQA Guidelines because it consists of the minor alteration of existing structures, facilities, mechanical equipment involving negligible or no expansion of existing or former use at the site. The project is also categorically exempt pursuant to section 15303 of the CEQA Guidelines because it consists of the installation of small new equipment in small structures with only minor modifications to the structures. The project is also categorically exempt pursuant to section 15306 of the CEQA Guidelines because it consists of basic data collection, research and resource evaluation activities which will not result in a major disturbance to an environmental resource. The project does not involve any unusual circumstances, will not result in damage to any scenic resources within a highway officially designated as a state scenic highway, the project site is not included on any list compiled pursuant to Government Code section 65962.5, and the project will not cause a substantial adverse change in the significance of a historical resource. The project, when considered as a whole, will not result in a cumulative impact that is significant on the environment. Therefore, none of the exceptions to exemptions listed in CEQA Guidelines section 15300.2 apply to this project and this project will not have a significant effect on the environment.

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

Legal Company Name:	Budget
Stafl Systems, LLC	\$ 300,000
California Mobility Center	\$ 14,000
Thermocline Labs Inc	\$ 12,000
Fabcon, Inc.	\$ 25,000

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	\$2,000,000

R&D Program Area: N/A:

TOTAL: \$ 2,000,000

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Alexander Mrlik

Address: 475 Coloma St Ste 190

City, State, Zip: Sausalito, CA
94965-3808

Phone: 415-567-0446

E-Mail: zander@intertie.com

2. Recipient's Project Manager

Name: Richard Mrlik

Address: 475 Coloma St Ste 190

City, State, Zip: Sausalito, CA
94965-3808

Phone: 415-567-0446

E-Mail: rmrlik@intertie.com



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L) Selection Process Used

- ☒ Competitive Solicitation Solicitation #: GFO-20-301
- ☐ 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 | <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

Deputy Director

Date

Exhibit A
Scope of Work
Intertie Incorporated

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Productize PEM Prototype for Fast Charger with Pre-Charger and Firmware Modifications
3		Design, Test and Productize PEM Prototype to Power Ultra-Fast Charger
4		Design, Build and Test Cost-effective, Scalable Power Block Providing DC/DC Conversion Required for Ultra-Fast Charging
5		System Validation of PEM-Powered Ultra-Fast Charger Connected to Solar Plus Storage Microgrid
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
BMS	Battery Management System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
FMEA	Failure Mode Effects Analysis
PEM	Power Electronics Module
TAC	Technical Advisory Committee
VEC	Vault Environmental Control

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

A. Purpose of Agreement

The purpose of this Agreement is for the Recipient (Intertie Incorporated) to design, develop and build an advanced power electronics module (PEM) that enables a commercially available fast charger to supply high power to electric vehicles via a low amp (A) grid connection which will enable ultra-fast charging to be deployed quickly at almost any location, substantially decreasing the cost, and accelerating the buildout of a fast-charging network. The project team shall directly connect a fast charger to energy storage and solar resources using the PEM to validate the improved energy efficiencies and reduced operating costs realized from the DC-coupling technology.

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

Intertie Incorporated

B. Problem/ Solution Statement

Problem

Significant barriers with California's grid must be overcome to accommodate the State's mandated goal of requiring sales of all new passenger vehicles to be zero-emission by 2035.² The major barrier for increased EV adoption is the lack of a convenient, large, and reliable network of EV fast chargers.³ Most commercially available fast chargers connect directly to the grid and have high power requirements.⁴ Ultra-fast charging, which can be defined as greater than 100kW, exacerbates this problem, requires more costly electric upgrades and has higher operating costs due to high demand charges. This barrier makes it difficult and cost-prohibitive to install fast chargers where they would be most convenient for drivers, such as gas stations, multi-unit dwellings and commercial properties. Without this charging infrastructure in place, EV ownership can be inconvenient and economically unsuitable for many California residents, which could severely inhibit the state's rate of EV adoption.

Solution

Intertie's EV ChargePod™ overcomes the key barrier of costly electric infrastructure upgrades for ultra-fast charging by decoupling the charger from the AC grid. This is a productized DC microgrid that connects a fast charger, energy storage and a grid-tied bidirectional AC/DC converter sized to available grid capacity. Furthermore, adding DC-coupled distributed solar to the microgrid improves the economics and resilience of the ultra-fast charging process. The project seeks to develop a commercially available ultra-fast charger that supplies high power to electric vehicles via a low amp grid connection that can be deployed quickly at almost any location. The key functions are to pre-charge storage with electricity while it is less expensive and to supply an EV with high power levels without straining the electric grid. To connect commercially available fast chargers to a DC microgrid, integration of hardware and firmware solutions are needed. The benefits of a successful project will result in significantly lowering the price of EV charging infrastructure expansion, which could greatly aid the state of California in achieving its mandated level of EVs in a timely manner without needing to spend additional time and resources upgrading its existing energy grid.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are:

- Complete 'proof of concept' power electronics module (PEM) or Basic PEM prototype that includes pre-charger, auxiliary controls and firmware modifications that enables a basic fast charger to be powered directly from a battery referred to as "DC Coupling".

² "Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change." September 23, 2020
<https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/>

³ "Biden's Electric Car Plans Hinge on Having Enough Chargers." September 7, 2021
<https://www.nytimes.com/2021/09/07/business/energy-environment/electric-vehicle-charging-stations.html>

⁴ "How Will the Grid Adjust to EV Charging?" August 9, 2021
<https://www.tdworld.com/electrification/article/21168252/how-will-the-grid-adjust-to-ev-charging>

Exhibit A Scope of Work Intertie Incorporated

- Design, build and test the operating limits of Basic PEM prototype.
- Design, build and test a modular power block that provides the necessary DC/DC conversion stage to the Basic PEM prototype, referred to as the “Enhanced PEM”, which provides more universal interface capability for ultra-fast charger stations to DC bus that simultaneously connects battery storage, grid-tied AC/DC converter and/or local sustainable supplies such as rooftop solar.
- Demonstrate how the Enhanced PEM, connecting the charger, battery system and small bidirectional grid-tie inverter, referred collectively as the EV ChargePod™, can discharge over 100 kW of power for charging via low amp grid connection.
- Enable next generation ultra-fast charging using the EV ChargePod™ for low-grid impact fast charging.
- Test and operate vault environmental control (VEC) system that maintains safe, reliable battery conditions and a ground-source thermal system to maintain optimal battery temperatures when operating at higher C-rates from boosted ultra-fast charging.

Ratepayer Benefits:⁵

This Agreement will result in the ratepayer benefits of greater electric reliability, lower costs, and increased safety. Intertie’s EV ChargePod™ technology maximizes electric reliability for ratepayers through its ability to offer superfast charging without placing additional strain on the grid and function as a source of backup power in times of grid outages. It also provides value to a site by being able to reduce electric costs from behind-the-meter applications such as peak shaving and demand charge reduction while also providing value to the grid from services such as demand response and resource adequacy. The product’s ability to be installed in any location without requiring grid upgrades significantly lowers costs for ratepayers as it will defer expensive utility upgrades.

The EV ChargePod provides significantly enhanced safety of use through its utilization of underground storage to house its battery. Housing the storage underground reduces risk posed by fire, weather, theft, and vehicles while providing ideal temperature resulting in more efficient battery operation.

Technological Advancement and Breakthroughs:⁶ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California’s statutory energy goals by demonstrating that the PEM technology, by minimizing the grid impact of ultra-fast charging, enables more economic and expeditious deployment of an ultra-fast charger network in California. The technological advancement will also more broadly deploy ultra-fast charging, by being able to operate at the end of utility distribution circuits, where capacity is limited.

⁵ 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).

⁶

Exhibit A Scope of Work Intertie Incorporated

The objectives of this Agreement are to:

- Show that a fast charger can be cost-effectively DC-coupled to a battery using the “Basic PEM Prototype” which combines pre-charging circuits, communication interfaces and firmware.
- Demonstrate that the “Basic PEM” hardware can safely and reliably reduce the impact of fast charging on AC circuits and the AC grid.
- Complete the design and development of cost-effective modular power blocks that provides the necessary DC/DC conversion between a charger and DC microgrid that more universally connects ultra-fast charging stations to battery storage and/or solar.
- Combine power block, pre-charge circuitry and firmware to build prototype “Enhanced PEM” hardware. Test Enhanced PEM in Intertie power laboratory.
- Test Enhanced PEM hardware ability to provide ultra-fast charging to microgrid located at Intertie’s laboratory.
- Design and operate battery ground-source heat rejection system capable of operating battery system at required high C-rates to boost ultra-fast charging.

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)**. 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.

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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:

- 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.

Exhibit A Scope of Work Intertie Incorporated

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
- 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*)

Exhibit A Scope of Work Intertie Incorporated

- 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.

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)

Exhibit A

Scope of Work

Intertie Incorporated

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).
 - 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

Exhibit A Scope of Work Intertie Incorporated

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.

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**)

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- 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*)
- 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.

Exhibit A

Scope of Work

Intertie Incorporated

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
- 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

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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.
- 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

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- 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;
- 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.

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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.
- 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.

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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

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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: PRODUCTIZE PEM PROTOTYPE FOR FAST CHARGER WITH PRE-CHARGER AND FIRMWARE MODIFICATIONS

The goal of this task is to complete the engineering and design work needed to determine the specifications and features required for a PEM using both in-house and external resources. This will involve multiple iterations of analysis, simulation and design of a PEM module and firmware with the goal to enable a fast charger to be able to operate connected directly to DC bus that also connects a battery system and/or local solar.

The Recipient shall:

- Identify and engage the external expertise, if any, needed to successfully complete the engineering and design work associated with this task.
- Complete a thorough engineering analysis to establish Basic PEM prototype hardware and firmware specifications for battery-booster fast charging use case
 - Describe all interfaces between Basic PEM, VEC and Battery Management System (BMS) including inputs, outputs, and processing to be performed
 - Define Basic PEM performance metrics
 - Evaluate accuracy required of outputs from inputs over full range of expected operating conditions and environments that achieves performance metrics
 - Complete DC Pre-Charge specifications
- Complete initial testing of communication with EVSE Charge Controller
- Complete design process to productize Basic PEM prototype integrated to existing fast charger electronics to minimize hardware development and validation time and reduce risk with using unknown hardware.
- Complete assembly of Basic PEM prototype inside enclosure with appropriate communication and power connection, disconnects and overcurrent protection
- Complete testing of Basic PEM with fast charger in Intertie laboratory
- Prepare a non-confidential *System Engineering and Design Report* that includes but is not limited to the following:
 - A description of the external expertise, if any, engaged to assist with the completion of this task along with the rationale for the selection or lack of selection;
 - A discussion of the results of the engineering analysis and Basic PEM prototype performance metrics; and
 - A discussion of the final system design and how it achieves the Basic PEM prototype performance metrics and/or required modifications.
 - This report will be 10-15 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Prepare *CPR Report #1* and participate in a CPR meeting in accordance with subtask 1.3 (CPR Meetings).

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Products:

- System Engineering and Design Report
- CPR Report #1

TASK 3: DESIGN, TEST AND PRODUCTIZE PEM PROTOTYPE TO POWER ULTRA FAST CHARGER

The goal of this task is to determine the charging limits of the Basic PEM prototype for ultra-fast charging. This will involve a thorough effort to analyze the prior development in Task 2, evaluate the new pre-charger circuitry for commercially available fast charger, make necessary firmware modifications, source the optimal components, build the system, successfully test it, and ultimately determine if the Basic PEM can achieve ultra-fast charging speeds.

The Recipient shall:

- Identify and engage the external expertise, if any, needed to successfully complete the facility upgrade and build and test a PEM prototype.
- Complete engineering analysis of Basic PEM operating at high current levels required by ultra-fast charging.
 - Define PEM performance metrics
 - Outline cross-functional failure model effects analysis (FMEA) for integrated PEM and battery operation
- Complete enhanced floating bus algorithm enabling Basic PEM's DC input to be able to match battery voltage that changes or floats with changing state-of-charge
- Develop and test embedded firmware enabling Basic PEM to be powered directly from the battery.
- Complete design and safety analysis to accommodate high current capacity.
- Complete a vendor selection process for all elements of the Basic PEM prototype
- Complete construction of upgrading Intertie's power electronics lab to accommodate higher power transfer levels
- Place orders for all elements of the Basic PEM prototype with the selected vendors.
- Receive and unit test all elements of the Basic PEM working with vendors to correct deficiencies as needed.
- Complete construction and assembly of higher power Basic PEM prototype inside NEMA enclosure with appropriate communication and power connection, disconnects and over current protection
- Complete testing for updated software and firmware on ultra-fast charger
- Test Basic PEM with fast charger after upgrading Intertie power laboratory to accommodate higher power charging
- Prepare a non-confidential *Basic PEM System Construction Report* that includes, but is not limited to, the following:
 - A description of the external expertise, if any, engaged to assist with the completion of this task along with the rationale for the selection or lack of selection;
 - A discussion of the results of the vendor selection process; and
 - A discussion of the Basic PEM construction process, the issues encountered, and the lessons learned.
 - This report will be 10-15 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.

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Products:

- Basic PEM System Construction Report

TASK 4: DESIGN, BUILD AND TEST COST-EFFECTIVE, SCALABLE POWER BLOCK PROVIDING DC/DC CONVERSION REQUIRED FOR ULTRA-FAST CHARGING

The goal of this task is to integrate the design specifications and testing procedures from the Basic PEM technology determined in Task 3 to integrate DC/DC conversion optimized to DC-couple ultra-fast chargers. The strategy is to design modular power electronic blocks that can be various levels of ultra-fast charging and capable of being integrated with an existing charger. The power blocks will be combined with the Pre-charger and firmware modifications.

The Recipient shall:

- Identify and engage the external expertise, if any, needed to successfully complete the supply chain development work associated with this task.
- Complete power block modeling and analysis
 - Complete simulation of power block operating at high current operation
 - Complete preliminary design support
 - Complete safety analysis and determine power block emergency conditions
 - Complete critical design review support
 - Complete testing of module arrangement in software environment
 - Complete final test plan
- Prepare a non-confidential *DC/DC Conversion Test Plan* that includes but is not limited to the following:
 - A thorough description of the final test plan
 - This report will be 3-5 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Complete control system design, build and testing
 - Design master controller
 - Stability testing and analysis
 - Design redundant COMM module
 - Write Communication Software for DC/DC conversion
 - Test and Debug Communication software
- Completed enhanced VEC design and schematics capable of:
 - Thermal management for modular DC/DC conversion blocks
 - Thermal management for battery system under ultra-fast charging
 - Humidity control
 - Other environmental control factors
- Build pre-production prototype (PPP) power electronics block
- Test PPP power electronics block at high DC voltage (600 to 1000V)
- Assemble modular DC/DC power conversion with controls
- Produce converter test plan; Conduct HV testing and analysis
 - Complete FMEA identifying failure modes to be considered and potential mitigation strategies
- Complete system integration
 - Write system controls
 - Simulate system controls
 - Write and test new interface between PEM and Intertie EMS

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- Integrate Intertie EMS with control system
- Commission and test
- Prepare a non-confidential *DC/DC Conversion Validation Report* that includes but is not limited to the following:
 - A thorough description of the results of the end-to-end pilot production process test;
 - An analysis of how the results compare to expectations and existing industry standards; and
 - A discussion of the issues encountered, lessons learned, the next steps necessary to begin LRIP and the plan to transition to FRP.
 - This report will be 10-15 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.

Products:

- DC/DC Conversion Test Plan
- DC/DC Conversion Validation Report

TASK 5: SYSTEM VALIDATION OF PEM-POWERED ULTRA FAST CHARGER CONNECTED TO SOLAR PLUS STORAGE MICROGRID

The goal of this task is to validate the full PEM-powered ultra-fast charger connected to solar plus storage microgrid with low amperage building connection. This system will be tested and validated with an existing, committed first customer. This will primarily involve developing a thorough test plan, executing it and analyzing the results.

The Recipient shall:

- Prepare a non-confidential *System Test Plan* that includes, but is not limited to, the following:
 - A description of the test objectives;
 - A description of the test procedures;
 - A description of the test inputs, outputs, and conditions; and
 - A description of the how test data will be acquired and analyzed.
 - This plan will be 3-5 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Execute the *System Test Plan* to produce a set of system validation metrics.
- Complete design and fabrication of VEC and associated thermal system
 - Complete thermal load simulation on battery system
 - Complete design for ground-source heat rejection system.
 - Identify system components and vendors
 - Place orders for all elements of system with the selected vendors
 - Receive materials for system
 - Complete fabrication of ground source thermal system
 - Connect ground-source thermal system to battery system
- Complete single-line electrical plan showing power equipment, disconnects, fusing, grounding, and insulation monitoring (required for DC bus operation)
- Complete installation cabling, over current protection, and safety switches necessary to connect battery system, PEM interface, ultra-fast charger, and interconnection with DC-coupled solar onsite, metering and monitoring equipment
- Complete design and installation of monitoring, metering, and data acquisition system

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- Complete commissioning and operation of full system that included a battery-boosted PEM ultra-fast charger at a customer site.
- Validate the results of the system performance in partnership with an existing, committed customer by thoroughly analyzing the validation metrics to ensure they conform to expectations and outlined specifications.
- Perform engineering and validation iterations until all expectations and industry specifications are reasonably met.
- Prepare a non-confidential *System Validation Report* that includes but is not limited to the following:
 - A thorough description of the results of the validation test;
 - An analysis of how the results compare to expectations and existing industry standards; and
 - A discussion of the issues encountered, lessons learned, the next steps necessary to begin LRIP and the plan to transition to FRP.
 - This report will be 5-15 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.

Products:

- System Validation Test Plan
- System Validation Report

TASK 6: 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* each year by January 31st. 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 the project profile for 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.
- Update annually, at a minimum, the project profile for the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund) annually by January 31st.
- If the Prime Recipient is an Innovation Partner on the project, complete the organizational profile for the CEC's public online project and recipient directory on the [Energize Innovation](http://www.energizeinnovation.fund)

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[website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

- If the Prime Recipient is an Innovation Partner on the project, update annually, at a minimum, the organization profile for the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund) by January 31st.

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 7: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to conduct activities that will accelerate the commercial adoption of the technology being supported under this agreement. Eligible activities include, but are not limited to, the following:

- Scale-up analysis including manufacturing analysis, independent design verification, and process improvement efforts.
- Technology verification testing, or application to a test bed program located in California.
- Legal services or licensing to secure necessary intellectual property to further develop the technology
- Market research, business plan development, and cost-performance modeling.
- Entry into an incubator or accelerator program located in California.

The Recipient Shall:

- Develop and submit a *Technology Transfer Plan (Draft/Final)* that identifies the proposed activities the recipient will conduct to accelerate the successful commercial adoption of the technology.
- Present the *Draft Technology Transfer Plan* to the TAC for feedback and comments.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the *Draft Technology Transfer 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 Technology Transfer Plan* to the CAM for approval.
- Implement activities identified in *Final Technology Transfer Plan*.
- Develop and submit a *Technology Transfer Summary Report (Draft/Final)* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the *Final Technology Transfer Plan*. This report should not include any proprietary information.

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- 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 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:

- Technology Transfer Plan (Draft/Final)
- Summary of TAC Comments
- Technology Transfer Summary Report (Draft/Final)
- High Quality Digital Photographs

PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: INTERTIE INCORPORATED

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-21-014 with Intertie Incorporated for a \$2,000,000 grant to design, develop and build an advanced power electronics module (PEM) that enables a commercially available fast charger to supply high power to EVs to allow ultra-fast charging to be deployed quickly at almost any location. The project team shall directly connect a fast charger to energy storage and solar resources using the PEM to validate the improved energy efficiencies and reduced operating costs realized from the direct current-coupling technology; and

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

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on January 26, 2022.

AYE:

NAY:

ABSENT:

ABSTAIN:

Liza Lopez
Secretariat