California Energy Commission
June 11, 2025 Business Meeting
Backup Materials for FreeWire Technologies, Inc.

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Amendment Request Form
3. Scope of Work

[PROPOSED]

RESOLUTION NO: 25-0611-03m

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: FreeWire Technologies, 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 amendment 2 for Agreement EPC-20-022 for a novation to change grant recipient from FreeWire Technologies, Inc. to OptiGrid LLC, to extend the term by three years, modify some technical specifications within the scope of work (SOW), change the location of the demonstration sites from two public light-duty EV charging sites to one site at a warehouse for a fleet of class 8 electric vehicles (heavy-duty electric trucks); 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 June 11, 2025.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kim Todd
Secretariat

STATE OF CALIFORNIA

GRANT AMENDMENT REQUEST FORM (GARF)

CEC-277 (Revised 01/2024) CALIFORNIA ENERGY COMMISSION

Original Agreement # EPC-20-022 Amendment # 2

Division	Agreement Manager:	MS-	Phone
ERDD	Phillip Healy		

Recipient's Legal Name	Federal ID #
FreeWire Technologies	46-4847451

Revisions: (check all that apply)	Additional Requirements
☒ Term Extension New End Date: 3/31/2028	Include revised schedule and complete items A, B, C, & F below.
☐ Budget Augmentation Amendment Amount: $ 0	Include revised budget and complete items A, B, C, D, & F below.
☒ Budget Reallocation	Include revised budget and complete items A, B, C, & F below.
☒ Scope of Work Revision	Include revised scope of work and complete items A, B, C, E, & F below.
☒ Change in Project Location or Demonstration Site	Include revised scope of work and complete items A, B, C, E, & F below.
☒ Novation/Name Change of Prime Recipient	Include novation documentation and complete items A, B, C, & F below.
☐ Terms and Conditions Modification	Include applicable exhibits with bold/underline/ strikeout and complete items A, B, C, & F below.

A) Business Meeting Information

Business Meeting approval is not required for the following types of Agreements:

☐ Minor amendments delegated to Executive Director per December 2013 Resolution

Proposed Business Meeting Date 6/11/2025 ☒ Consent ☐ Discussion

Business Meeting Presenter Phillip Healy Time Needed: 0 minutes

Please select one list serve. Select

Agenda Item Subject and Description:

FreeWire Technologies, Inc.

FreeWire Technologies, Inc. Proposed resolution approving amendment 2 for Agreement EPC-20-022 for a novation to change grant recipient from FreeWire Technologies, Inc. to OptiGrid LLC, to extend the term by three years, modify some technical specifications within the scope of work (SOW), change the location of the demonstration sites from two public light-duty EV charging sites to one site at a warehouse for a fleet of class 8 electric vehicles (heavy-duty electric trucks), and adopting staff's recommendation that this action is exempt from CEQA. (EPIC funding) Contact: Phillip Healy

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

Legal Company Name:	**Budget**
TBD Marketing Firm	$ 5,000
Lab for UL Certification	$ 1,100,000
Build Momentum (d.b.a. Momentum)	$ 219,000
PCBA Contractors (vendor)	$ 140,000
TBD Electrician (vendor)	$ 100,000
TBD Engineering Design Firm (vendor)	$ 208,370
TBD Construction (vendor)	$ 500,000
	$
	$
	$

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

Legal Company Name:

D) Budget Information (only include amendment amount information)

Funding Source	**Funding Year of Appropriation**	**Budget List Number**	**Amount**
			$
			$
			$
			$
			$
			$

R&D Program Area: TIEB: EDMF TOTAL: $ 0

Explanation for “Other” selection

Federal Agreement #:

E) 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:

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

Explain reason why Agreement is exempt under the above section:

b) ☐ Agreement **IS NOT** exempt. (consult with the legal office to determine next steps)

Check all that apply

☐ Initial Study

☐ Negative Declaration

☐ Mitigated Negative Declaration

☐ Environmental Impact Report

☐ Statement of Overriding Considerations

F) Is this project considered "Infrastructure"? No

G) The following items should be attached to this GARF (as applicable)

1.	Exhibit A, Scope of Work/Schedule	☐ N/A	☐ Attached
2.	Exhibit B, Budget Detail	☐ N/A	☐ Attached
3.	CEQA Documentation	☐ N/A	☐ Attached
4.	Novation Documentation	☐ N/A	☐ Attached
5.	CEC 105, Questionnaire for Identifying Conflicts		☐ Attached

_____ _____
Agreement Manager **Date**

_____ _____
Branch Manager **Date**

_____ _____
Director **Date**

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2	X	Product Engineering and Design
3		Construction, Commissioning, and Operations
4		Certifications
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
DCFC	DC Fast Charger
DCM	Demand Charge Management
EV	Electric Vehicle
IOU	**Investor-Owned Utility**
kWh	**Kilowatt-Hour**
LD	**Light-Duty**
M&V	**Measurement & Verification**
MHD	**Medium- and Heavy-Duty**
SBP	Site Backup Power
TAC	Technical Advisory Committee
UL	Underwriter's Laboratory
VPP	Virtual Power Plant
ZEV	**Zero-Emission Vehicle**

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

A. Purpose of Agreement

The purpose of this Agreement is to provide add-on funding to support and accelerate the design, engineering, ~~and~~ demonstration**, and commercialization** of an advanced, **battery** storage-**integrated** and grid-integrated **supportive** electric vehicle (EV) fast charger. The system will represent a new **direct current fast charger (DCFC)** product line for the Recipient, providing

[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.

several key resiliency benefits to ~~commercial~~ customers**, utilities, and their ratepayers via the integration of on-board battery storage: simplified installation, which reduces cost and time for deployment (up to months or years) compared to a non-battery-integrated charger, demand charge savings and reliability benefits for customers, and reduced demand on investor-owned utilities (IOUs) to supply power.** ~~that include renewables integration, battery-based charging capacity even when the grid goes down, microgrid storage and backup, reduced grid congestion, reduced demand charges, reduced infrastructure requirements, and other grid and resiliency services, thus benefiting EV users and investor-owned utility ratepayers~~.

B. Problem/ Solution Statement

Problem

The Recipient recognizes that demand for EVs**, both light duty (LD) EVs and medium- and heavy-duty (MHD) EVs** ~~has increased rapidly~~ **is increasing significantly**, ~~along with need for EV charging~~ **and the associated increase in demand for charging infrastructure is drastic**. **The California Energy Commission's (CEC's) *AB 2127 Second Electric Vehicle Charging Infrastructure Assessment* estimates that 109,000 depot chargers and 5,500 en-route chargers will need to be deployed by 2030 to meet the anticipated demand from new MHD EVs.[2] That means an average of 440 chargers would need to be deployed per week from 2025 through 2030. The rollout this infrastructure is significantly slowed down by the need for utilities to upgrade existing grid infrastructure to deliver power where chargers are desired. In the status quo, it simply will not be possible to deploy the amount of chargers needed using traditional solutions that rely wholly on grid-supplied power. While the pace of these infrastructure upgrades has been hastened through the California Public Utilities Commission's (CPUC) efforts to set new energization timelines for California IOUs, and through the implementation of Rules 29 and 45, improvement is still needed to ensure that California meets its EV infrastructure deployment targets. Further, EV charging currently suffers from a reputation problem; drivers are hesitant to adopt EVs due to concerns about the reliability of charging infrastructure. These issues are compounded by the disproportionate impact that MHD diesel vehicle operations have on air quality and public health in disadvantaged communities, necessitating faster transition to Zero-Emission Vehicle (ZEV) operations.**

Grid reliability concerns have also risen to the forefront as California's utilities and grid managers struggle to balance electricity load and supply. California has recently endured brown-outs and blackouts caused by extreme weather, fire danger, and an ageing grid system. The addition of direct current fast charging (DCFC) introduces a uniquely challenging type of load for utilities to balance, characterized by short and high-power demand peaks. Utilities have been addressing this by adjusting time-of-use rates and demand response programs to incentivize, and sometimes require, that EV charging load be curtailed. This negatively impacts Site Host and EV drivers by introducing further uncertainty about the reliability and performance of grid-dependent chargers and by adding complexity to charge scheduling. This is especially challenging for MHD vehicle

[2] **California Energy Commission. (2024, February). Assembly Bill 2127 Second Electric Vehicle Charging Infrastructure Assessment: Assessing Charging Needs to Support Zero-Emission Vehicles in 2030 and 2035. *California Energy Commission*. https://www.energy.ca.gov/publications/2024/assembly-bill-2127-second-electric-vehicle-charging-infrastructure-assessment**

fleet operators that operate within tight profit margins and rely on maximum asset uptime and reliability.

Finally, as utilities make the grid upgrades required to meet the demand for EV charging, significant costs are incurred by those upgrades, and those costs will be passed on to utility ratepayers. New solutions are needed to hasten the deployment of reliable charging infrastructure in a cost-effective manner, and those solutions must elegantly support utilities and site hosts by reducing the extent of grid upgrades needed and increasing the reliability of on-site power supply. ~~Business owners and managers view EV charging as a potential opportunity to serve employees and clients, and to generate revenue. However, business owners and managers also face multiple challenges and concerns, including EV charger installation costs, justification for the use of capital dollars, space requirements, electricity costs, service disruption, and electricity reliability.~~

~~Reliability concerns have risen to the forefront as California's utilities and grid managers struggle to balance electricity load and supply. California has recently endured brown-outs and blackouts caused by extreme weather, fire danger, and an ageing grid system. More EVs and increasing demand for EV charging could exacerbate these concerns and further stress California's grid. Unfortunately, such disruptions cause costly downtime and create critical concerns for business owners and managers, industrial facilities, commercial buildings, and other key contributors to the state's economy. Although business owners and managers as well as other potential EV charging site hosts (collectively hereinafter referred to as "Site Hosts") are hesitant to deploy EV charging if it could exacerbate reliability concerns, they are seeking to deploy systems and technologies that improve resiliency and buffer from outages to manage reliability risk. System-wide grid upgrades needed to improve reliability are exceptionally costly, and those costs could be passed on to utility ratepayers. Nonetheless, mass deployment of EV charging can only occur if Site Hosts feel confident that their core business and ability to charge vehicles will remain operational and resilient, and Site Hosts are increasingly seeking installation of new infrastructure that supports improved resiliency.~~

Solution

The Recipient's proposed system is intended to **significantly reduce the scale of distribution** ~~substantially alleviate the need for~~ grid **upgrades needed to enable charger energization, hastening the start of charger operations. It will also improve reliability and lessen strain on the utility grid**~~updates, while improving power and charging reliability on site and addressing the key concerns of Site Hosts~~. **To reduce the additional load attributable to EV charging on the grid, the recipient's solution uses a battery-integrated charger that reduces the need for costly grid upgrades and reduces peak period demand, thus reducing electricity and infrastructure costs to the site host.** ~~o reduce the impact of EV charging on the grid, the Recipient's solution provides power from an integrated battery that is charged during off-peak periods. Thus, the system aims to reduce peak period power demand, reduces the need for costly grid upgrades , and reduce electricity costs to the charger site~~ The proposed turnkey~~, modular system~~ design further reduces soft costs related to business analysis, permitting and utility requirements, and deployment costs, while addressing the critical needs of Site Hosts **to access and use charging power more cost effectively.** ~~for resiliency and electric system reliability. First, to reduce the impact of EV charging on the grid, the Recipient's solution provides power from an integrated battery that is charged during off-peak periods. Thus, the system aims to~~

~~reduce peak period power demand, reduces the need for costly grid upgrades, and reduce electricity costs to the charger site.~~

~~Second, to address reliability concerns~~**In this project**, the Recipient**, OptiGrid LLC,** ~~seeks to integrate several key reliability services into its EV chargers~~ **will build and expand upon the charger design and intellectual property, which it purchased from FreeWire Technologies, Inc., to bring a viable battery-integrated charger to market. To de-risk CEC's investment in this project, the recipient will partner with the electric terminal tractor, Orange EV. By developing and deploying OptiGrid's Gen 1 battery-integrated charger in partnership with a terminal tractor operator, the Recipient will pilot the use of a system with strong potential to benefit several key stakeholders in the market for commercial EV charging: ZEV fleet operators and charger site hosts, and utilities. Development of this product will bring a novel charger to market that can reduce the need for distribution grid upgrades, reduce energy costs for site hosts, and enable reliable operations for ZEV fleet operators**. ~~These services include modifications that maximize the integrated battery storage to provide EV charging, resiliency benefits to the Site Host, and utility ratepayer benefits. Specifically, the upgraded system will enable bi-directionality to act as battery storage capable of putting power back onto the grid and supporting critical functions of the Site Host, or integrate into a microgrid to support islanding and / or renewable power management and storage. Furthermore, by enabling Site Host self-generation to be used in conjunction with Boost Charger as a microgrid, sites should be able to optimize energy costs and electricity availability.~~

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Complete all development and engineering of the proposed ~~grid~~**battery**-integrated ~~storage~~ and **grid-supportive** DC fast charger system~~s~~ (**OptiGrid Gen 1**~~Boost Charge Pro and Boost Power Pro~~).
- Build, install, and operate the proposed system~~s~~ during ~~two~~**an** on-site demonstration.
- ~~Build, install, and operate the proposed Battery Farm System during a third demonstration with performance at utility scale (i.e., 500 kW of power flow).~~
- Compete UL certification to support subsequent commercialization.

Ratepayer Benefits:[3] This Agreement is intended to result in the ratepayer benefits of:

- **Greater reliability:** The proposed project ~~should~~**will** improve ~~electricity~~ reliability to ~~EV users for charging by developing and demonstrating a microgrid-enabled~~ EV charger**s and the** ~~with 160 kWh of battery storage that is usable even during a complete~~ grid ~~outage; this power could also be used to support other emergency operations across a microgrid. The project will aim to improve grid resiliency by reducing peak period charging demand, which should result in reduced grid bottlenecks~~.

[3] 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).

- **Reliability for Site Host: Through the deployment of chargers with integrated, on-board batteries, the Recipient will enable the site host to begin charger operations sooner than it could with conventional, non-battery-integrated DCFCs. The Recipient will coordinate with its partner site host and utility to commence charging using the amount of grid-supplied power capacity that is currently available, relying on the on-board battery to serve as a multiplier which can enable charger operations while the site awaits any necessary additional grid infrastructure upgrades.**
- **Grid Reliability: The project will also support the maintenance of grid reliability by reducing the amount of grid-provided power that each battery-integrated charger requires, reducing demand and supporting utilities' efforts to maintain a balance of power supply and demand. This reduced demand will reduce strain on utilities to supply power, especially during peak periods, smoothing out power demand. Subsequently, this will benefit utility ratepayers by increasing utilities' ability to reliably supply power and decreasing utility-side infrastructure upgrade costs that may otherwise be passed on to ratepayers.**

- **Lower costs:** The proposed project will support lower costs for **the Site Host and** electricity ratepayers through several mechanisms. **For the Site Host, ~~T~~t**he proposed system will ~~allow Site Hosts to~~**enable** better manage**ment of** on-site power demand by limiting grid power draw during peak periods and shifting battery charging to off-peak hours, while reducing utility demand charges. This is referred to as Demand Charge Management (DCM). ~~It~~**Subsequently, this** will greatly reduce the need for **costly** upgrade~~d~~**s to** utility infrastructure that would otherwise be needed to provide DC fast charging capability, potentially saving Site Hosts tens to hundreds of thousands of dollars per installation. **This cost avoidance** ~~It will~~**would** also ~~provide multiple cost saving~~ benefit~~s to utilities, which could then be passed down to~~ **IOU** ratepayers ~~as reduced pressure to increase rates. The elements of DCM include: renewable power management including load balancing for renewables; high-efficiency integration of renewables for storage, reduced grid congestion by charging during off-peak periods. Improved on-site storage used for EV charging and auxiliary/site power is also included and referred to as Site Backup Power (SBP). This element in particular has strong potential to lead to reduced costs by alleviating business down time that is typically associated with grid-down events. The DCM and SBP capability are all managed via a Virtual Power Plant (VPP)~~**by avoiding the pass thru of costs associated with such grid updates**.
- ***Increased safety:*** The proposed project will provide improved safety by completing UL certification for the DC fast charger (DCFC) designs. UL certification will be carried forward onto all subsequent DCFC production for the systems to be commercialized under this project. **The Recipient will obtain certification to all necessary and applicable UL standards (See Task 4) to deliver a product to market that meets the highest standards of safety and efficiency.** Moreover, reductions in peak period power demand will reduce the likelihood of blackouts and brownouts in state, improving potential safety conditions associated with those occurrences. ~~Because of the SBP capability, the system will also provide EV charging capacity even when the grid is down, potentially reducing risk of stranding and range limitations for EV users.~~

Technological Advancement and Breakthroughs:[4]

This Agreement will lead to technological advancement and breakthroughs to overcome **challenges faced by California IOUs, EV charger product providers, and EV charger site hosts with respect to the pace and cost of grid upgrades. By bringing battery-integrated fast chargers to the market, the Recipient will provide an elegant solution that enables significantly faster charger energization for site hosts and relief to IOUs that are challenged by a high demand for extensive grid upgrades. Specifically, the project will bring the following advancements: 1) Resilient battery-enabled EV charging while grid upgrades are being completed and 2) On-site power demand management to reduce the overall energy costs for a Site Host (i.e., providing DCM).**~~barriers to the achievement of the State of California's statutory energy goals by adding new grid-oriented and resiliency services to the Recipient's existing EV charger systems. The project will specifically add the following advancements: 1) Resilient EV charging even when grid power is unavailable (i.e., providing SBP) ; 2) Backup power supply to power on-site loads as a microgrid (i.e., managing connected energy resources via a VPP); 3) On-site power demand management to reduce the overall energy costs for a Site Host (i.e., providing DCM); 4) Direct integration with on-site renewable sources, such as solar, to increase the efficiency of the solar + storage system and reduce its total cost (i.e., another VPP capability)~~**~~;~~** ~~5) Bi-directional power flow to support charger-to-grid power flow (i.e., another VPP capability)~~**~~;~~** ~~and 6) Utility integration to support demand response, grid load balancing and other grid services (i.e., DCM). When performed at utility scale (i.e., deliver 500 kW of power flow, and store 1.6 MWh of energy), the interrelated VPP, SBP, and DCM capabilities constitute what the Recipient refers to as a Battery Farm.~~

Agreement Objectives

The objectives of this Agreement are to:

- Complete engineering and design of the proposed **battery** storage- and grid-~~integrated~~**supportive** DC fast charger systems (~~Boost Charge Pro and Boost Power Pro~~ **Optigrid Gen 1**);
- Deliver a market-ready solution ready for mass production by completing safety and standards compliance certification for the ~~Boost Charge Pro and Boost Power Pro~~ **Optigrid Gen 1** by project completion;
- Kick off the Recipient's new line of **battery** storage-**integrated** and grid~~-integrated~~**-supportive** EV chargers by constructing and installing ~~two full-function systems for Boost Charge Pro at one site and two full-function system for Boost Power Pro at another site, this other site also installing the Battery Farm~~ **the OptiGrid Gen 1 in a DAC in IOU territory in partnership with an electric terminal tractor fleet operator**;
- Operate the systems for a period of 11 months each, to demonstrate and confirm the following system benefits **compared to conventional DCFCs without integrated on-board battery storage**:
    - ~~Battery-based grid-down EV charging capacity sufficient to charge 5 EVs with an average of 25 kWh each;~~
    - ~~Demonstrate battery-based EV charging without a connection to grid power by relying only on internal battery storage;~~

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

- ~~Provide at least 160 kWh per unit of renewable energy storage to support renewables integration;~~
- ~~Demonstrate operation of a 2-way inverter and utility integration to help manage duck curves, utility loads, and other grid services to support renewables integration;~~
- ~~Demonstrate ability to operate critical site loads for at least 2 hours while utility grid is down (40-50kW / 160kWh);~~
- ~~Support >~~**3**~~% overall efficiency improvement from direct DC integration with solar to energy storage as compared to AC integration between solar and storage~~
- ~~Quantify savings to site host from combined charger with back-up power;~~
- **Benefits for EV Charger Users and Site Hosts**
  - **Evaluate the ability for OptiGrid Gen 1 to provide battery-based EV charging.**
  - **Demonstrate the increase in charger uptime resulting from resilience added by the inclusion of integrated, on-board battery storage**
  - **Quantify energy cost avoidance to site host from the use of a battery-integrated charger and subsequent demand charge and energy charge avoidance**
  - **Quantify the reduction in customer-side electric grid infrastructure upgrades and associated costs**
  - **Quantify the reduction in deployment and charger energization time**
  - **Quantify the average throughput that the battery-integrated charger can achieve per day, in terms of both (kWh delivered per day and number of EVs supported per day**
- **Benefits for Utilities and Ratepayers**
  - **Quantify the reduction in utility-side electric grid infrastructure upgrades and associated costs**
  - **Demonstrate and quantify the reduction in demand for grid-supplied power via use of DCM**

III. 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.

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.

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 <u>administrative portion</u> 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 <u>technical portion</u> 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.

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).
    - 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.

Recipient Products:
- Final Report Outline (draft and final)

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

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)*
- 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

- 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.
- 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;
- 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.
- 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*.
  - 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*.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

IV. TECHNICAL TASKS

TASK 2 PRODUCT ENGINEERING AND DESIGN (PHASE 1 AND PHASE 2)

The goal of this task is to complete all engineering and design for the proposed system, and to produce production-ready designs that will enable production of the proposed demonstration model under Task 3, and subsequent manufacturing of the system for commercial sale. ~~Engineering and design will follow the same general process for both the Phase 1 (Boost Charge Pro) and Phase 2 (Boost Power Pro) deployments, although the latter will include additional development time to incorporate additional services such as the Battery Farm.~~ Specific services and elements to be included for each phase are identified below.

The Recipient shall:

- Design and engineer all system elements**, including the following**. ~~Key elements of the design will draw heavily on the Recipient's existing Boost Charger system. However, the Recipient will expand on Boost Charger design in the following key areas~~:
    - Software updates ~~(Phase 1 and 2)~~. The Recipient will update the system's software to support deployment of all of the key ~~grid~~**customer and stakeholder (e.g., utilities** service elements included in the project. These will include:
        - DC fast charging ~~even without a grid connection (Phase 1 and 2)~~;
        - ~~Full microgrid integration and communication including islanding ability (Phase 2);~~
        - Load leveling including off-peak storage and peak period reliance on stored power to provide EV charging capacity ~~(Phase 2)~~;
        - Intelligent grid connection to support load and duck curve management for renewable power ~~(Phase 2)~~;
    - ~~Bi-Directional Inverter integration (Phase 2). The Recipient will incorporate a high-efficiency, bi-directional inverter into the Boost system, to allow energy stored in the system's batteries to flow back onto the grid or a microgrid when called upon; inverter integration will include the following steps:~~
        - ~~Review existing, commercially available high efficiency bi-directional inverters that are currently on the market; identify potential candidates for use under the project based on targeted specifications and physical size of the proposed system~~
        - ~~If suitable or potentially suitable system(s) is/are identified, procure the targeted equipment~~
        - ~~Test integration of the procured equipment in the early phase Boost system, and confirm compatibility~~
        - ~~If no sufficient system is identified during the review process, or if the procured systems are insufficient for the proposed Boost system, the Recipient will self-design and manufacture the needed system to required specifications for the Boost system. Refer to the project narrative for additional information regarding target performance of the bi-directional inverter.~~
    - ~~Microgrid controller integration (Phase 2). The Recipient will incorporate a microgrid controller (i.e., VPP) into the design of the system;~~
    - ~~DC Direct Connection (Phase 2). The Recipient will install a DC direct connection, which will allow solar PV (or other renewables) to be connected to the Boost on-~~

~~board battery, without an inverter. Removing the inverter stage improves energy efficiency.~~

- Structural upgrades (Phases 1 and 2). The Recipient will design structural and physical upgrades to the system's housing and other internal elements to accommodate the additional elements above.

- Complete fabrication-ready design documents
- Prepare and provide to the CAM a *Written Notice of Completion of Engineering Plans*. The notice will include, but is not limited to:
  - Cover and summary pages of the final engineering documents (additional documentation available upon request, pending confidentiality limitations);
  - Summary of lessons learned during the design and engineering phase;
- Prepare and submit to the CAM a *Construction and Equipment List* that will be used for the procurement and fabrication process.
- Prepare *CPR Report*

Products:

- Written Notification of Completion of Engineering Plans ~~(Phase 1)~~
- ~~Written Notification of Completion of Engineering Plans (Phase 2)~~
- ~~Written Notification of Completion of Engineering Plans (Battery Farm)~~
- Construction and Equipment List ~~(Phase 1)~~
- ~~Construction and Equipment List (Phase 2)~~
- ~~Construction and Equipment List (Battery Farm)~~
- CPR Report

TASK 3 CONSTRUCTION, COMMISSIONING, AND OPERATIONS

The goal of this task is to complete all fabrication and construction/installation activities for the project, to subsequently complete all testing and commissioning activities for the project, and finally to initiate operation. Upon successful commissioning, project operations will commence. ~~Note that these activities shall apply to each of the two project sites (Phase 1 and Phase 2). The Recipient will install the Boost Charger+ during the Phase 1 installation and the Boost Charger 2.0 during the Phase 2 installation. The Recipient will initiate the Phase 1 installation process first, then initiate the Phase 2 installation process thereafter, although some degree of overlap in the two installations is anticipated. Additional details on the phasing of the two demonstration projects is provided in the Project Schedule.~~

The Recipient shall:

- Prepare and provide *Draft Procurement Plans* ~~(includes Phase 1 and Phase 2)~~ for the project that will detail the process for procurement of equipment, materials, and services in a manner that provides transparency into the selection process and the rationale for optimizing the quality of services / equipment provided with price. The *Procurement Plans* will include but will not be limited to:
  - A description of the bid packages to be assembled
  - A methodology for receiving and evaluating responses
- Incorporate feedback from CAM and submit *Final Procurement Plans.*
- Execute the Procurement Plan.

- Prepare and provide *Draft Construction and Installation Plans* ~~(includes Phase 1 and Phase 2)~~ for the demonstrations that will outline the budget and schedule for the completion of all fabrication, construction, and installation activities. The Construction and Installation Plans will include, but will not be limited to:
    - A list of fabrication, construction, and installation milestones
    - A Gantt chart and detailed project schedule
    - A risk mitigation strategy
    - A plan for quality control and quality assurance
- Incorporate feedback from CAM and submit *Final Construction and Installation Plans.*
- Prepare and provide a *Written Notification of Site Readiness* ~~(includes Phase 1 and Phase 2)~~ for each site that will notify the CAM that the site has been prepared to initiate construction/installation.
- Implement the Construction and Installation Plan including all construction and installation related activities.
- Prepare and provide a *Draft Construction Report* ~~(includes Phase 1 and Phase 2)~~ for the facility that will evaluate the actual construction activities compared to the Construction Plan. The Construction Report will include, but will not be limited to:
    - A final schedule of completed milestones
    - A description of lessons learned
    - A summary of any major project changes if relevant
- Incorporate feedback from CAM and submit *Final Construction Report.*
- Prepare and provide *Written Notification of Completion of Construction and Installation* ~~(includes Phase 1 and Phase 2)~~ for each site. This memorandum will notify the CAM that construction and installation activities have been completed.
- Prepare a *Draft Testing and Commissioning Plan* that ~~will cover both Phase 1 and Phase 2 activities, and~~ will detail the processes, deliverables, and milestones needed to complete testing and commissioning of the project. The Testing and Commissioning Plan will include, but is not limited to:
    - A description of the equipment to be commissioned
    - A description of the methodology to test/commission the identified equipment
    - A description of the quality control and quality assurance practices for the test methodology
- Incorporate feedback from CAM and submit *Final Testing and Commissioning Plan.*
- ~~•~~ Implement the Testing and Commissioning Plan ~~(includes Phase 1 and Phase 2)~~
- Prepare and provide a *Draft Testing and Commissioning Report* ~~(includes Phase 1 and Phase 2) for the Phase 1 and Phase 2 facilities (combined)~~ that will document and evaluate the test results. The Testing and Commissioning Report will include, but will not be limited to:
    - A description of the results for all commissioning related testing
    - A description of any major changes that were made based on findings during commissioning process
- Incorporate feedback from CAM and submit *Final Testing and Commissioning Report.*
- Prepare and provide a *Written Notification of Completion of Commissioning* ~~(include Phase 1 and Phase 2)~~ for each of the proposed installations, that will notify the CAM that all testing and commissioning activities have been completed, and that the project is now ready to commence operations.

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

- Operate the project during a 11-month demonstration project and complete measurement and verification (M&V) based on the M&V plan included in the project narrative as follows:
    - The Recipient will produce a *Draft Measurement and Verification Report* to ensure all project benefits are measured and quantified. Specifically, the benefits the Recipient is seeking to demonstrate and measure **include** the following:
        - ~~Confirm 160 kWh of on-board, usable storage: On-board charging tracking system will record amount of stored energy and monitor the battery system's state of charge and state of health (Phase 1 and 2)~~
        - ~~Confirm 160 kWh of storage for grid-down EV charging: the Recipient will disconnect the system from grid power, then complete 160 kWh of EV charging, then measure the kWh supplied by the system, minus a reserve supply for continued operation of the system for additional DC input, safety sensors and system reboot. (Phase 1 and 2)~~
        - ~~160 kWh of storage for power backup: Disconnect the system and microgrid (or at least one connected on-site load) from the grid, then use on-board stored power to operate the site, and measure the kWh supplied by the system (Phase 2)~~
        - ~~150 kW DC output power rating for DC fast charging: the Recipient will connect a vehicle capable of charging at 150 kW or higher, then measure the power transfer rate, in kW, during normal, grid-connected operations (Phase 1 and 2)~~
        - ~~Installation cost reduction: the Recipient will compare utility supply upgrade costs from the project site, based on contractor or utility estimates, project installation cost (Phase 1 and 2)~~
        - ~~Microgrid installation: Operate the system in island mode while also providing DCFC and site backup power, then measure peak kW critical circuit site draw and duration of back-up power functionality, for at least 2 hours (Phase 2)~~
        - ~~Power cost reduction from peak load shifting: Track and quantify the total utility power consumption costs, including demand charges and the timing of consumption, under the project using an on-site smart meter. The Recipient concurrently tracks EV charging kWh and timing, and will then compare actual costs to a hypothetical scenario where all power used for EV charging is pulled from the grid at time of use, as if charging were not available. The Recipient will use applicable utility rate schedules to compare the cost of this hypothetical operation to that of the project, to quantify cost savings (Phase 2)~~
        - ~~500 kW of combined power flow (Battery Farm).~~
        - **Evaluate the ability for OptiGrid Gen 1 to provide battery-based EV charging by:**
            - **Measuring the number of charging sessions attempted and number of successful charging sessions completed**
            - **Logging the total energy delivered in each charging session with power output rates**
            - **Logging the total energy delivered in each session, separated by source (i.e., kWh from the on-board battery versus kWh from grid-supplied power)**

- **Demonstrate the increase in charger uptime resulting from resilience added by the inclusion of integrated, on-board battery storage by:**
  - **Tracking charger availability, uptime, and downtime and comparing it to publicly available data on non-battery-integrated charger reliability**
- **Quantify energy cost avoidance to site host from the use of a battery-integrated charger and subsequent demand charge and energy charge avoidance by:**
  - **Tracking energy and power usage, including peak power demand**
  - **Tracking discharge start and stop times, as well as discharge durations, for use of the on-board battery**
  - **Comparing the items above to determine when peak power usage occurred and any overlaps with battery discharge**
  - **Collecting utility bills to track volumetric energy costs and demand charges**
  - **Comparing peak power usage, battery discharge, and utility bills to estimate cost avoidance resulting from battery discharge**
- **Quantify the reduction in customer-side electric grid infrastructure upgrades and associated costs by:**
  - **Coordinating with the electric utility to obtain two scenario quotes:**
    - **Scenario 1: Grid infrastructure upgrade needs assuming no on-board batteries**
    - **Scenario 2: Actual grid infrastructure upgrade needs with the inclusion of on-board batteries**
  - **Coordinating with the electric utility to compare the estimated costs of Scenarios 1 and 2**
- **Quantify the reduction in deployment and charger energization time by:**
  - **Tracking timelines for all stages of site development, deployment, and start of charger operations**
  - **Coordinating with the electric utility and local permitting agencies to obtain data on typical timelines for similarly sized systems**
- **Quantify the average throughput that the battery-integrated charger can achieve per day, in terms of both kWh delivered per day and number of EVs supported per day by:**
  - **For each charger deployed:**
    - **Using on-board charger software to track the kWh delivered per day and the number of charging sessions started and ended each day**
    - **Calculating averages using the data above**
- **Quantify the reduction in utility-side electric grid infrastructure upgrades and associated costs by:**
  - **Coordinating with the electric utility to obtain two scenario quotes:**

- **Scenario 1: Grid infrastructure upgrade needs assuming no on-board batteries**
- **Scenario 2: Actual grid infrastructure upgrade needs with the inclusion of on-board batteries**

- **Coordinating with the electric utility to compare the estimated costs of Scenarios 1 and 2**

- **Demonstrate and quantify the reduction in demand for grid-supplied power via use of DCM by:**
  - **Tracking energy and power usage, including peak power demand**
  - **Tracking discharge start and stop times, as well as discharge durations, for use of the on-board battery**
  - **Comparing the items above to determine when peak power usage occurred and any overlaps with battery discharge**
  - **Collecting utility bills to track volumetric energy costs and demand charges**

- Incorporate feedback from CAM and submit *Final Measurement and Verification Report.*

Products:

- Procurement Plans (Draft/Final)
- Construction and Installation Plans (Draft/Final)
- Written Notification of Site Readiness
- Construction Report (Draft/Final)
- Written Notification of Completion of Construction and Installation
- Testing and Commissioning Plan (Draft/Final)
- Testing and Commissioning Report (Draft/Final)
- Written Notification of Completion of Commissioning
- Measurement and Verification Report (Draft/Final)

TASK 4 CERTIFICATIONS

The goal of this task is to complete applicable / relevant equipment certifications.

The Recipient shall:

- Complete required UL **and other relevant** certifications including the following **(the Recipient will subcontract completion of certifications to an approved Nationally Recognized Testing Laboratory)**:
  - UL 9540 (Standard for Energy Storage Systems and Equipment) and 9540a (Standard for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems).
    - ~~The Recipient will subcontract completion of UL certification to an approved certification laboratory.~~
  - ~~UL 1741 (Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources).~~
    - ~~The Recipient will subcontract completion of UL certification to an approved certification laboratory.~~

- ~~Updated certifications for the existing Boost Charger UL Certifications:~~ UL 2202, UL 2231-1, UL 2231-2, UL 991, and UL 1973 (on the battery pack)
- **Energy Star**
- **California Type Evaluation Program or National Type Evaluation Program**

- Complete and submit to the CAM a *Notification of Completion of UL Certification* that notifies the CAM when the UL certification process is complete

Products:

- Notification of Completion of UL Certification

TASK 5 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 the 'Relevant data collection period' set to 'Kickoff' and submitted to the CAM for review and approval.
- Complete the Annual Survey by January 31 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 the 'Relevant data collection period' set to 'Final' 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), and provide *Documentation of Project Profile* on *EnergizeInnovation*, 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), and provide *Documentation of Organization Profile* on EnergizeInnovation.fund, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Surveys
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 6 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

Exhibit A
Scope of Work
~~FreeWire Technologies, Inc.~~ Optigrid, LLC

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.
- 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 site~~s~~ or related project photographs.

Products:

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.