



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC - 21 - 040 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Misa Werner	51	916.776.3477

C) Recipient's Legal Name	Federal ID Number
Pyro-E, Inc.	86-2640044

D) Title of Project
Residential Water Bill Reduction with Self-powered Diagnostics & Services

E) Term and Amount

Start Date	End Date	Amount
6/30/2022	6/30/2027	\$ 1,548,602

F) Business Meeting Information
☐ ARFVTP agreements \$75K and under delegated to Executive Director

 Proposed Business Meeting Date 6/8/2022 ☐ Consent ☒ Discussion

Business Meeting Presenter Misa Werner Time Needed: 5 minutes

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

Agenda Item Subject and Description:

Pyro-E, Inc. Proposed resolution approving Agreement EPC-21-040 with Pyro-E, Inc. for a \$1,548,602 grant to deploy a novel Auto-Modulating Power Source (AMPS) device that will demonstrate water and cost savings across approximately 150 affordable housing units in Los Angeles, and adopting staff's determination that this action is exempt from CEQA. The AMPS technology powers wireless data sensors indefinitely by harnessing energy from water pressure. For municipal utilities, multi-family housing, and corporate buildings, AMPS alleviates manual processes such as water meter readings, service connection and disconnection, water-use identification, leakage notification, and emergency shutoffs. The bill savings from water and avoidance of lithium battery replacements will be scalable to over two-thirds of California households to meet Assembly Bill 758 mandates and other municipal green initiatives. (EPIC funding) Contact: Misa Werner.

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, 15306

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

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Explain reason why Agreement is exempt under the above section:

This grant agreement will fund a project to test, manufacture, demonstrate, and deploy a novel technology, Auto-modulating Power Source (AMPS): a device that powers wireless data sensors by harnessing energy from water pressure, resulting in less wasted water and increased cost savings.

Testing and evaluation of a prototype AMPS device will include simulations, data analysis, and market research; will be performed in an existing laboratory; and will not require modifications to the facility. The AMPS devices will be manufactured in an existing facility and will not require modifications to the facility. The devices will then be installed in approximately 150 units at a multi-family housing residence. The installation will be a non-intrusive screw-fitting type to the tap water line (supply side).

This agreement is therefore categorically exempt from environmental review pursuant to section 15301 of the CEQA Guidelines because it involves the operation or minor alteration of existing structures, facilities, or mechanical equipment involving negligible or no expansion of existing or former use of the sites. The agreement 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 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, and this agreement will not have a significant effect on the environment.

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

Check all that apply

- ☐ Initial Study
☐ Negative Declaration
☐ Mitigated Negative Declaration
☐ Environmental Impact Report
☐ Statement of Overriding Considerations

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

Legal Company Name:	Budget
QorTek, Inc.	\$ 100,000 match
Instron	\$90,000
Nordson	\$70,000
Agilent	\$30,000
Agie GF Machining Solutions	\$100,000
Centorr Vacuum Industries	\$25,000



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

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	21-22	301.001I	\$1,548,602
			\$
			\$

R&D Program Area: EDMFO: EDMF

TOTAL: \$ 1,548,602

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

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

Name: Kevin Lu

Address: 9248 1/2 Hall Rd

City, State, Zip: Downey, CA
90241-5308

Phone: 510-578-8849

E-Mail: kevin.lu@pyro-e.com

2. Recipient's Project Manager

Name: Kevin Lu

Address: 9248 1/2 Hall Rd

City, State, Zip: Downey, CA
90241-5308

Phone: 510-578-8849

E-Mail: kevin.lu@pyro-e.com

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

☒ Attached

2. Exhibit B, Budget Detail

☒ Attached

3. CEC 105, Questionnaire for Identifying Conflicts

☒ Attached

4. Recipient Resolution

☒ N/A☐ Attached

5. CEQA Documentation

☐ N/A☒ Attached

Agreement Manager

Date



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CALIFORNIA ENERGY COMMISSION

Office Manager

Date

Deputy Director

Date

**Exhibit A
Scope of Work
Pyro-E, Inc.**

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Material Manufacturing
3		Product Procurement
4		Product Deployment
5	X	In-house Fabrication & Acceptance
6		Highly Accelerated Life Testing (HALT)
7		Product Certification for Commercial Sale
8	X	Measurement & Verification of Successful Metrics
9		Evaluation of Project Benefits
10		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AMPS™	Auto-modulating Power Source
BOM	Bill of Material
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
CRL	Commercial Readiness Level
GHG	Greenhouse Gas
GPCD	Gallons of water per capita per day
MRL	Manufacturing Readiness Level
MLPC	Multi-layered Piezoelectric Capacitor
Recipient	Pyro-E, Inc.
TRL	Technology Readiness Level

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

A. Purpose of Agreement

The purpose of this Agreement is for Recipient (Pyro-E, Inc.) to demonstrate a new water use and monitoring technology and demonstrate cost savings. The pilot study seeks to provide bill savings data to confirm an average payback on equipment of less than three years without grants or rebates (less than 18-month payback with municipal rebates). The development falls in line with green initiatives for U.S. cities. Los Angeles, for example, has goals to achieve meaningful broad-based water use reduction. The baseline is the current water usage per capita per day of

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

Exhibit A Scope of Work Pyro-E, Inc.

103 gallons/capita-day (GPCD): a 2020 averaged figure. The aggregate target is less than 100 GPCD. With 10-percent market penetration, in response, the proposed water-use reduction is 7.1 GPCD. The project will demonstrate the proposed water technology in multifamily housing within a disadvantaged community.

B. Problem/ Solution Statement

Problem

The cost of lithium batteries has fallen dramatically in the past decade. For a 4-hour, grid-tied solution, the levelized cost is approaching \$0.20/kilowatt-hour (kWh). However, single-use batteries can be 1,000 times more expensive given the need for replacement. Throw-away batteries remain the most expensive source of power in the world today. Consequently, battery devices are extremely low power, typically drawing <1 milliwatt (mW) on average to reduce the burden of replacements or recharging. The poor economics limit the use of battery devices at scale (for instance, large-scale infrastructure monitoring). Alternatively, energy harvesting could support numerous and more powerful devices while generating cost savings over time.

Solution

Water usage submetering represents an application to monitor resource usage where power is not readily available. Naturally occurring pressure ripples inside pipes could provide the source of wireless power. In response, this technology, Auto-modulating Power Source (AMPS™), works with pressure ripples and frequencies as low as 2 pounds per square inch (psi) and 0.25 hertz (Hz), respectively. The dynamics match the typical pressure profile measured in a domestic piping system. Preliminary experimental testing yielded an equivalent battery storage of 300 milliamp-hour (mAh) per week – equivalent to 1,000 lithium cells over 10 years – thereby able to support sensing, data storage, and wireless communication. The data intermittency and duty (i.e., the proportion of on-to-off duration), may be adjusted to improve battery management. The mechanical-to-electric energy conversion process is robust and efficient, without needing sliding components, chemical lubricants, or dynamic controls. The AMPS™ power and meter hardware also serves as a data platform for future embedded AI integration to improve metering accuracy and predictive capability to mitigate waste and reduce billing.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Validate proof of customer benefits with up to 34% bill savings on water.
- Help monitor water use for leakage detection and mitigate inadvertent water use, including running toilets and clothes washers.
- Improve water quality with autonomous sensing, tracking, and reporting of contamination.
- Provide service and emergency shutoff features to mitigate expensive plumbing contractor costs (~\$200/visit).

Exhibit A Scope of Work Pyro-E, Inc.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefit of lower costs and improved public health by enabling widescale water submetering and quality monitoring.

The technology being deployed is a 100-mW new and retrofit device for smart water metering. The AMPS™ technology powers wireless data indefinitely by harnessing energy from water pressure. For municipal utilities, multi-family housing, and corporate buildings, AMPS™ alleviates manual processes such as water meter readings, service connection and disconnection, water-use identification, leakage notification, and emergency shutoffs. The concept works by converting natural pressure ripples into electricity via the piezoelectric effect – a material-led phenomenon that converts applied pressure into electrical current – in a manner without requiring fluid contact.

The AMPS™ meter works with pressure ripples as low as 2 psi and frequencies less than 0.25 Hz. Preliminary experimental testing yielded energy for an equivalent storage of 300 milliamp-hour (mAh) per week, thereby able to support sensing, data storage, and wireless communication. The energy conversion process is robust and efficient, without needing sliding components, chemical lubricants, or complex controls. Overall, AMPS™ provides unique value proposition in water advanced metering infrastructure (AMI) through:

- Enabling massively deployed devices across the water distribution network
- Contactless energy harvesting to mitigate contamination, blockage, and maintenance
- Automated manual processes with intelligent data to reinforce cost saving measures
- Open-source hardware for sensor and software integration

Technological Advancement and Breakthroughs: 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 generating up to 34-percent water-use reduction for low-income families. The savings corresponds to an estimated average saving of \$323 per residence per year, or 34.2% of the baseline. With 1% residential market penetration, the water-use reduction is 0.71 gallon per capita per day (GPCD), 5% = 3.6 GPCD, and 10% = 7.1 GPCD.

Agreement Objectives

The objectives of this Agreement are to:

- Design and build a component pilot line capable of producing 100 AMPS™ devices per month using proprietary energy harvesting technology
- Validate manufacturability of critical product components having high dimensional precision, with a potential to replace 1,000 batteries over 10 years.
- Design the pilot line to be capable of producing products with up to 34-percent bill reduction and a failure rate <1.5 percent per year.
- Validate proof of manufacturing quality with long-term performance degradation <0.3-percent per year.
- Retrofit 150 multi-family affordable housing residences for water submetering.

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

**Exhibit A
Scope of Work
Pyro-E, Inc.**

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.

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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 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);

Exhibit A Scope of Work Pyro-E, Inc.

- 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*)
- 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

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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., Zoom) 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, 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.

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- 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

Exhibit A Scope of Work Pyro-E, Inc.

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**)
 - 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

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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.

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- 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*)

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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.

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- 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.

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- 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 identify key performance targets for the project. 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 section of 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.

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Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

IV. TECHNICAL TASKS

TASK 2 MATERIAL MANUFACTURING

The goal of this task is for Pyro-E and project partners to co-develop a custom (multi-layered piezoelectric capacitor) MLPC for AMPS™ with a predetermined set of performance and cost targets.

Subtask 2.1 MLPC Design

This subtask will focus on refining the current manufacturing process for lowering the cost of piezoelectric stacks.

The Recipient shall:

- Identify the predetermined set of performance and cost targets
- Analyze and refine the current manufacturing process for lowering the cost of piezoelectric stacks. Details of the analysis include but are not limited to:
 - Eliminating precious metal with silver-electrode textured multilayer stacks
 - Improving production throughput with open or reduced atmosphere sintering (heating material up to the melting point for material grain growth)
 - Weatherizing device to passivate against corrosion

Subtask 2.2 MLPC Delivery

Project partners will deliver up to 10 multilayer cofired textured stacks to the Recipient for acceptance.

The Recipient shall:

- Co-develop a custom MLPC for AMPS™ and produce an *AMPS Materials Manufacturing Report*. This document will include graphics and figures, and an executive summary that is written for a non-technical audience. The document shall document the items listed below, at minimum.
- Ensure the MLPC delivery exhibits the following details including but not limited to:
 - Nominal dimensions, 5x5x2.5 mm³ (WxHxL) using low-cost electrodes
 - >2x higher energy harvesting capability than legacy MLPCs
- Assess the surface finishes quality following the MIL-STD-1376 piezoelectric material standard³
- Verify mechanical strength and geometric consistency using laser-doppler image processing for the following:
 - Elastic modulus under transient and off-axis loading between -40 to 60 °C
- Fatigue strength up to 100,000 compression cycles at 80 Gigapascals
- Incorporate feedback on the draft report from CAM and submit Final *AMPS Material Manufacturing Report*.

Products:

³"Piezoelectric Ceramic Material And Measurements Guidelines For Sonar Transducers." Naval Military Standard, 24 Feb 2005.

Exhibit A Scope of Work Pyro-E, Inc.

- AMPS Material Manufacturing Report (Draft/Final)

TASK 3 PRODUCT PROCUREMENT

The goal of this task is to acquire all necessary components through suppliers and in-house manufacturing within geometric, mechanical, and electrical specifications.

Subtask 3.1 Material Evaluation

The goal of this subtask is to evaluate MLPCs from project partners for product integration.

The Recipient shall:

- Conduct electrical testing on MLPCs to evaluate the MIL-STD-1376 piezoelectric material standard and material yield.
- Conduct RLC (resistance, inductance, capacitance) measurements to verify the following:
 - Dielectric property (i.e., capacitance) using an impedance analyzer
 - Dielectric strength (i.e., leakage current) using an impedance analyzer
 - Mechanical factors in piezo-strain yield, hysteresis, and dielectric strength
- Document inspection results for traceability.

Subtask 3.2 Ancillary Components

The goal of this subtask is to procure ancillary components to meet trial quantities of approximately 200 units.

The Recipient shall:

- Select raw materials for fatigue life and durability for MLPC flexors, which experience yield-limit strains over long-term cycles. The material candidates include:
 - SS304 – inhibited against corrosion but susceptible to plastic strain at yield
 - Steel 4041 – high extensional elastic modulus and yield stress but susceptible to humidity and corrosion without surface treatment
- For mechanical strength and tolerances, verify the following:
 - Geometric consistency with image processing
 - Elastic modulus under transient and off-axis loading between -40 to 60 °C
 - Fatigue strength over 100,000 cycles at 200% maximally applied stress
- Iterate embedded chipset and software to optimize power and duty-cycle for efficiency.
- Document iterative design changes for traceability, process optimization, and iterative improvements.

Subtask 3.3 Data & Software

The goal of this subtask is to integrate data acquisition, communication, and analytics to report metering, diagnostic, and leakage information to building management. Development is supported by third-party services for fast implementation.

The Recipient shall:

- Finalize UI/UX (user interface/user experience) customization with third-party services.
 - Amazon Web Services for data warehousing, security, and predictive analytics
 - IOSight web application for real-time monitoring of tenant water usage
- Provide on-site training and support to building management, including user-interface customization and integration with existing management software.

Exhibit A Scope of Work Pyro-E, Inc.

- Produce a draft *Product Procurement Report* documenting all Task 3 subtasks above, incorporate any edits from the CAM, and produce a final version of the report.

Products:

- Product Procurement Report (Draft/Final)

TASK 4 PRODUCT DEPLOYMENT

The goal of this task is to conduct technology trial at the customer site for evaluation and iterative improvements. The deployment will include an initial and a final phase to ensure product-market fit at the end of the project.

Subtask 4.1 Initial Deployment (~10 devices)

The goal of this subtask is to install an initial batch of approximately 10 devices (AMPS meters) to a subset of tenants for feasibility and client feedback.

The Recipient shall:

- Evaluate performance in energy harvesting, data collection, and reporting
- Leverage water usage data for developing predictive analytics of inefficient appliances
- Develop interconnection requirements for tapping into the pressurized supply line
- Develop operational requirements such as metering data intervals and reporting
- Identify submeter locations for various building types designed for retrofit
- Identify specific water-use activities for efficiency and bill reduction
- Track failure rates over 2 years to ensure <1.5% failure per year.

Subtask 4.2 Final Deployment (~140 devices)

The goal of this subtask is to install a final batch of approximately 140 AMPS meters to all tenants for product-market fit and establish value proposition for AMPS on actual tenant data.

The Recipient shall:

- Analyze actual tenant data and document the ability of AMPS to reach the following goals and provide features including but not limited to:
 - Up to 34% water bill reduction to multi-family households
 - Less than 18-month payback on equipment with municipal rebates
 - Less than 3-year payback on equipment without rebates or grants
 - Mitigation of water leaks from old pipes or loose connections
 - Diagnosis of inefficient water-use by appliances (e.g., running toilets)
 - Alert for inadvertent or excessive water use (e.g., car washes & irrigation)
- Produce a draft *AMPS Deployment Report* documenting activities and results from all Task 4 subtasks above, incorporate any edits from the CAM, and produce a final version of the report.

Products:

- AMPS Deployment Report (Draft/Final)

TASK 5 IN-HOUSE FABRICATION & ACCEPTANCE

The goal of this task is to assemble AMPS for balancing, qualification, and acceptance.

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Subtask 5.1 Custom Pick-and-Place Jig

The goal of this subtask is to design and fabricate custom tooling for MLPC insertion and alignment.

The Recipient shall:

- Automate the laborious process, which reduces part cost significantly. Details of this process will include but are not limited to:
 - Providing suction for pick-and-place line assembly.
 - Providing pneumatic actuation for flexor loading and extension.
 - Providing clamping for securing parts with MLPC-flexor fitment.

Subtask 5.2 Assembly & Acceptance

The goal of this subtask is to assemble the AMPS meter.

The Recipient shall:

- Assemble components to tolerance and specification
- Inspect spring rate within +/- 10% of specification
- Inspect power rating within +/- 10% of specification
- Inspect surface finish for scratches or blemishes
- Prepare a Critical Project Review (CPR) Report #1 and present progress at the CPR meeting.
- Produce a draft *AMPS Fabrication and Acceptance Report* documenting all Task 5 subtasks above, incorporate any edits from the CAM, and produce a final version of the report.

Products:

- AMPS Fabrication and Acceptance Report (draft/final)
- CPR Report #1

TASK 6 HIGHLY ACCELERATED LIFE TESTING (HALT)

The goal of this task is to test and verify the low rate initial production processing parameters through HALT to verify component lifetime under simulated environments. Accelerated testing will be conducted for lifetime evaluation. A custom jig will be used for testing with humidity control.

The Recipient shall:

- Conduct thermomechanical testing to evaluate the following:
 - Elastic modulus under transient and off-axis loading between -40 to 60 °C
 - Resonance frequency under vibration testing up to 100 Hz
 - Fatigue strength from high cycle counts up to 100,000s
- Conduct geometric and visual testing using image processing measurement devices
- Create laboratory testbed to simulate user-defined nominal and off-design conditions
- Modify and improve current apparatus for automated pressure control
- Test AMPS meter and map performance envelope
- Conduct Design Fault Mode and Effect Analysis
- Produce a draft *HALT Report* documenting Task 6 activities including but not limited to the above, incorporate any edits from the CAM, and produce a final version of the report.

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Product:

- HALT Report (draft/final)

TASK 7 PRODUCT CERTIFICATION FOR COMMERCIAL SALE

The goal of this task is to certify the product for commercial and residential sales and installation. It will follow California Plumbing Code ASSE1010 and all other applicable laws and standards. Other federal codes will be included in the certification process, including but not limited to FCC electronic radio frequency devices. Namely, the raw materials used in manufacture must not contain lead or other metal traces for safe drinking water.

The Recipient shall:

- Certify AMPS for commercial and residential sales and installation following California and federal codes listed above.
- Provide *NSF product certification for AMPS installation and sales*.

Product:

- NSF product certification for AMPS installation and sales

TASK 8 MEASUREMENT & VERIFICATION OF SUCCESSFUL METRICS

The goal of this task is to conduct formal reviews to assure successful technology trial and development are complete toward TRL, MRL, and CRL targets.

The Recipient shall:

- Provide a Technology Readiness Assessment (TRA) for TRL 8, which covers:
 - Product in final form and has been under the full range of operating conditions
 - Ability to achieve projected cost and schedule targets (Summer 2025). The following are the cost targets:
 - Equipment CAPEX - \$37/unit
 - Data service - \$5/month
 - Customer payback - less than 18 months
 - Customer value proposition developed including final specifications and features
 - Product certified for sale with completed user manual
- Provide a Critical Design Review (CDR) for MRL 4, which covers:
 - Integration processes of system assembly, installation, and testing
 - Bill of Material (BOM) testing, assembly, and final acceptance testing
 - Quality management control to reduce part variability
 - Production capability and capacity to meet in 100 units/month run rate
- Provide a Test Readiness Review (TRR) for CRL 4, which covers:
 - Products sold to initial customers
 - Supply chain determined to ensure no availability issues
 - Critical distribution channels determined and partnership under negotiation
- Prepare CPR Report #2 and present progress at the CPR meeting.
- Produce a draft *AMPS Measurement and Verification Report* including but not limited to all components above (i.e., TRA, CDR, TRR) , incorporate any edits from the CAM, and produce a final version of the report.

Products:

- AMPS Measurement and Verification Report (draft/final)

Exhibit A Scope of Work Pyro-E, Inc.

- CPR Report #2

TASK 9 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete the *Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by January 31st of each year. The Annual Survey includes but is not limited to the following information:
 - Technology commercialization progress
 - New media and publications
 - Company growth
 - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the [Energize Innovation website \(www.energizeinnovation.fund\)](http://www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

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

TASK 10 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

Exhibit A Scope of Work Pyro-E, Inc.

- 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 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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: PYRO-E, INC.

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

RESOLVED, that the CEC approves Agreement EPC-21-040 with Pyro-E, Inc. for a \$1,548,602 grant to deploy a novel Auto-Modulating Power Source (AMPS) device that will demonstrate water and cost savings across approximately 150 affordable housing units in Los Angeles. The AMPS technology powers wireless data sensors indefinitely by harnessing energy from water pressure. The bill savings from water and avoidance of lithium battery replacements will be scalable to over two-thirds of California households to meet Assembly Bill 758 mandates and municipal green initiatives; 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 8, 2022.

AYE:

NAY:

ABSENT:

ABSTAIN:

Liza Lopez
Secretariat