California Energy Commission
June 22, 2026 Business Meeting
Backup Materials for The Regents of the University of California as Manager and Operator of the Lawrence Berkeley National Laboratory

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

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

CALIFORNIA ENERGY COMMISSION

PROPOSED RESOLUTION: The Regents of the University of California as Manager and Operator of the Lawrence Berkeley National Laboratory

RESOLUTION NO: 26-0622-XX

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-25-055 with Lawrence Berkeley National Laboratory for a $5,900,000 grant. This project will fund the design, validation, and study of the Line Impedance Network Estimator (LINE) concept, featuring a novel method of extrapolating the power line and feeder capacity of secondary distribution networks through smart meter data acquisition and distributed machine learning. The project would validate and finalize a software tool suitable for large-scale IOU deployment via over-the-air updates to existing smart meters in the San Francisco Bay Area; and

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

APPROVED AND ADOPTED this 22 day of June 2026, by the following vote:

AYE:
NAY:
ABSENT:
ABSTAIN:

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 approved and adopted by affirmative vote of the CEC at a meeting held on June 22, 2026.

Kim Todd
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 01/2026)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

IMPORTANT: New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: EPC-25-055

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Pooya Khodaparast
3. MS-:None
4. Phone Number: 916-258-2956

C. Recipient's Information

1. Recipient's Legal Name: The Regents of the University of California as Manager and Operator of the Lawrence Berkeley National Laboratory

D. Title of Project

Title of project: Line Impedance Network Estimator (LINE) for Grid Mapping via Smart Meters

E. Term and Amount

1. Start Date: 7/01/2026
2. End Date: 3/30/2030
3. Amount: $5,900,000

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 6/22/2026 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Sebastian Rubio Ruiz
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: Electric Program Investment Charge (EPIC) Program

Project Description:

The Regents of the University of California as Manager and Operator of the Lawrence Berkeley National Laboratory. Proposed resolution approving agreement EPC-25-055 with Lawrence Berkeley National Laboratory for a $5,900,000.00 grant, and adopting staff's recommendation that this action is exempt from CEQA. This project will fund the validation and study of a novel method for extrapolating the local power secondary distribution line and feeder capacity through smart meter data acquisition and distributed machine learning. The project would validate and finalize a software tool in demonstration sites in the San Francisco Bay Area and inform future scale up for large-scale deployment via over-the-air updates. (EPIC funding) Contact: Sebastian Rubio Ruiz

G. California Environmental Quality Act (CEQA) Compliance

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

   If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and explain why Agreement is not considered a "Project":

2. **If Agreement is considered a "Project" under CEQA answer the following questions.**
   a) Agreement **IS** exempt?

      Yes

      Statutory Exemption?
      No

      If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

      PRC section number: None

      CCR section number: None

      Categorical Exemption?
      Yes

      If yes, list CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

      California Code of Regulations, title 14, section 15301 provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of use beyond that existing at the time of the lead agency's determination, are categorically exempt from the provisions of the California Environmental Quality Act (CEQA). The project consists of equipping advanced metering infrastructure (AMI) smart meters with distributed machine learning algorithms and installing them to extrapolate the capacity and topology of secondary distribution lines. The project would involve "minor alteration of existing public or private structures, facilities, mechanical equipment" in a manner consistent with the smart meters' designed and on-going use. These modifications will not result in any expansion of capacity. For these reasons, the proposed work will not have any significant effect on the environment and falls under section 15301.

      California Code of Regulations, title 14, section 15302 provides that the replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced is categorically exempt from CEQA. This exemption includes the replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity. Consistent with CEQA Guidelines Section 15302, the project consists of designing and developing a smart meter-based toolset combining machine learning, simulation, and decision support to map distribution line capacity and streamline utility load approvals in existing electrical meters. These modifications will result in negligible and no expansion of capacity to the existing meters. The project would include the installation of electric utility smart meters to passively monitor electric usage in the building. The project therefore involves the “replacement or reconstruction of existing utility systems and/or facilities involving negligible expansion of capacity” and falls under Section 15302.

California Code of Regulations, title 14, section 15306 provides that basic data collection, research, experimental management, and resource evaluation activities which do not result in serious or major disturbance to an environmental resource are categorically exempt from CEQA. This project consists of the installation of electric utility smart meters to passively monitor electric usage in an apartment building at the project site. The data collected will be used for a paper study of a novel method of estimating the capacity of secondary distribution networks through smart meter data acquisition and machine learning. The project will validate and finalize a software tool suitable for large-scale utility deployment including through over-the-air updates to existing smart meters. All applicable health, safety, and environmental rules and regulations would be followed; activities would be conducted by appropriately trained and qualified technicians and researchers. Energy use and emissions of existing facilities would generally be lowered by project implementation.

CEQA Guidelines Section 15300.2 describes a number of exceptions to categorical exemptions, which include the following: location, cumulative impact, significant effect, scenic highway, hazardous waste sites, and historical resources. These exceptions have been determined not to apply to the Project. This Categorical Exemption would not be used in cases where research activities might trigger one or more of the Section 15300.2 exceptions.

CCR section number: CCR section 15301, CCR section 15306, CCR section 15302

<u>Common Sense Exemption? 14 CCR 15061 (b) (3)</u>
No

If yes, explain reason why Agreement is exempt under the above section. If no, enter “Not applicable” and go to the next section.

Not Applicable.

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

No

If yes, answer yes or no to all that applies. If no, list all as “no” and “None” as “yes”.

Additional Documents	Applies
Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Is this project considered "Infrastructure"?

Yes

I. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter "No subcontractors to report" and "0" to funds. **Delete** any unused rows from the table.

Subcontractor Legal Company Name	CEC Funds	Match Funds
Pacific Gas and Electric Company	$ 2,678,640	$3,000,000
Association for Energy Affordability, Inc.	$ 490,114	$0
Schneider Electric USA, Inc.	$ 99,000	$0
Tenderloin Neighborhood Development Corporation	$ 25,000	$0
TBD - Site 2	$ 25,000	$0
Subcontractor of Association for Energy Affordability		
TBD – Community Based Organization Outreach Partner	*$90,000*	

J. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter "No vendors or sellers to report" and "0" to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
Materials/Miscellaneous of Pacific Gas and Electric Company		
Itron Networked Solutions, Inc.	*$460,000*	*$1,340,000*

K. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter "No key partners to report." **Delete** any unused rows from the table.

Key Partner Legal Company Name
No key partners to report

L. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	24-25	301.001L	$ 3,350,040
EPIC	25-26	301.001M	$ 2,549,960

TOTAL Amount: $ 5,900,000

R&D Program Area: ESTB: ETSI

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

M. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Joanna Santoro

Address: 1 Cyclotron Rd

City, State, Zip: Berkeley, CA 94720-0001

Phone: 510 486-6824

E-Mail: jlsantoro@lbl.gov

2. Recipient's Project Manager

Name: Daniel Gerber

Address: 1 Cyclotron Rd MS #90R2000

City, State, Zip: Berkeley, CA 94720-8028

Phone: 978-505-2305

E-Mail: sainslie@lbl.gov

N. Selection Process Used

There are three types of selection process. List the one used for this GRF.

Selection Process	Additional Information
Competitive Solicitation #	GFO-24-312
First Come First Served Solicitation #	Not applicable
Other	Not applicable

O. Attached Items

1. List all items that should be attached to this GRF by entering “Yes” or “No”.

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Yes
4	Recipient Resolution	No
5	Awardee CEQA Documentation	No

Approved By

Individuals who approve this form must enter their full name and approval date in the MS Word version.

Agreement Manager: Pooya Khodaparast

Approval Date: 5/11/26

Branch Manager: Reynaldo Gonzalez

Approval Date: 5/13/26

Director: Jonah Steinbuck delegated to Branch Manager

Approval Date: N/A

Exhibit A
Scope of Work
Lawrence Berkeley National Laboratory

I. TASK AND ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Simulation and Decision Support Tool
3	X	Laboratory Testing of LINE Smart Meter App
4		Field Testing of LINE Smart Meter App
5		Wide Area Deployment of LINE Smart Meter App
6	X	Electrical Load-Add Project Case Study
7		Outreach and Use Case Development
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AMI	Advanced Metering Infrastructure
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
GW	Gigawatts
LINE	Line Impedance Network Estimator
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the design, field validation, and study of a novel method of estimating the capacity of secondary distribution networks through smart meter data acquisition and distributed machine learning. The project will validate and finalize a software tool suitable for large-scale utility deployment including through over-the air updates to existing smart meters.

B. Problem/ Solution Statement

<u>Problem</u>

[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.

California utilities face growing demand to serve new electrical loads from devices such as electric vehicles and heat pumps. Statewide, peak demand is expected to rise by over 7 gigawatts (GW) by 2030. Yet most utilities lack accurate data on secondary distribution line capacity, especially for underground cables. The lack of data makes it difficult to predict if existing infrastructure can support the added load. As a result, utilities rely on manual inspections, adding cost and delays to electrical load projects. These delays are often worse in low-income communities with older infrastructure. Faster, data-driven tools are needed to assess line capacity, provide ongoing visibility, and reduce the costs and timelines of electrification projects.

<u>Solution</u>

The Recipient proposes to equip existing advanced metering infrastructure (AMI) smart meters with distributed machine learning algorithms to extrapolate the capacity and topology of secondary distribution lines, removing the need for manual inspections. AMI smart meters can detect subtle voltage drops caused by known downstream electrical loads. By synchronizing data from multiple meters, line impedance can be inferred and network connections can be reconstructed. This model-based approach replaces traditional, labor-intensive methods with a scalable, rapid, and cost-effective solution that enables continuous monitoring of grid conditions. The continuous monitoring system would allow utilities to assess system readiness quickly and accurately, reducing delays and costs associated with infrastructure assessments, which will help to overcome a pernicious barrier to new electrical load projects.

C. Goals and Objectives of the Agreement

<u>Agreement Goals</u>

The goals of this Agreement are to:

- Refine and test the Line Impedence Network Estimator (LINE) smart meter app through laboratory and field deployments to ensure accurate and reliable functionality in real-world utility settings.
- Demonstrate the use of LINE in actual utility workflows by streamlining load-add project approvals without manual inspections, thereby reducing costs and delays.
- Develop a Decision sSupport Tool that integrates a simulation framework for LINE’s performance with a data-driven approach to guide business and regulatory decisions.
- Build customer and stakeholder support through targeted outreach, user research, and use case development to increase smart meter adoption and customer engagement.

<u>Ratepayer Benefits</u>:[2] This Agreement will result in the ratepayer benefits of lower costs, greater electricity reliability, and increased safety. LINE will lower costs by replacing expensive, time-consuming manual inspections with automated assessments using smart meters. With improved visibility into the distribution network, utilities can approve new service faster and with greater confidence, reducing delays and inefficiencies in planning and operations.

[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).

Technological Advancement and Breakthroughs:[3] This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the state's goals by validating distributed machine learning algorithms that enable faster, more cost-effective, and more accurate assessments of secondary distribution infrastructure. Once validated in utility operations, the technology and approach can be scaled statewide via over-the-air updates, accelerating grid modernization and reducing delays in electrical load projects, particularly in communities with older infrastructure.

Agreement Objectives

The objectives of this Agreement are to:

- Design and develop a smart meter-based toolset combining machine learning, simulation, and decision support to map distribution line capacity and streamline utility load approvals.
- Demonstrate quantifiable improvement over baseline solutions on cost, timelines, and mapping accuracy, as described in the Project Performance Metrics (Subtask 1.13).
- Disseminate the findings and the benefits of the approach through lab and field testing, public whitepapers, stakeholder interviews, and targeted outreach to utilities, developers, and residents ultimately supporting utility adoption.
- Develop community outreach strategies to encourage customer adoption of smart meters, engaging residents and developers on their value and use cases.

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

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

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.

<u>For products that require a final version only</u>

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

<u>For all products</u>

- Submit all data and documents required as products in accordance with the following:

<u>Instructions for Submitting Electronic Files and Developing Software</u>:

- **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, and other CEC staff relevant to the Agreement. The Recipient's Project Manager and any other individuals deemed necessary by the CAM or the Project Manager shall participate in 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., Teams, Zoom), with approval of the CAM.

  The Kick-off meeting will include discussion of the following:
  - The CAM's expectations for accomplishing tasks described in the Scope of Work;
  - An updated Project Schedule;
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Travel;
  - Equipment purchases;
  - Administrative and Technical products (Subtask 1.1);
  - CPR meetings (Subtask 1.3);
  - Monthly Calls (Subtask 1.5)
  - Quarterly Progress reports (Subtask 1.6)
  - Final Report (Subtask 1.7)
  - Match funds (Subtask 1.8);
  - Permit documentation (Subtask 1.9);
  - Subawards(Subtask 1.10);
  - Technical Advisory Committee meetings (Subtasks 1.11 and 1.12);
  - Agreement changes;
  - Performance Evaluations; 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 may 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 may 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. A determination of unsatisfactory progress This may result in project delays, including a potential Stop Work Order, while the CEC determines whether the project should continue.
- 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(s)
- 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 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* organized by the tasks in the Agreement.

Products:
- Final Meeting Agreement Summary *(if applicable)*
- Schedule for Completing Agreement Closeout Activities

- All Final Products

MONTHLY CALLS, REPORTS AND INVOICES

Subtask 1.5 Monthly Calls

The goal of this task is to have calls at least monthly between the CAM and Recipient to verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.

The objectives of this task are to verbally summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, to verify match funds are being proportionally spent concurrently or in advance of CEC funds or are being spent in accordance with an approved Match Funding Spending Plan, to form the basis for determining whether invoices are consistent with work performed, and to answer any other questions from the CAM. Monthly calls might not be held on those months when a quarterly progress report is submitted or the CAM determines that a monthly call is unnecessary.

The CAM shall:

- Schedule monthly calls.
- Provide questions to the Recipient prior to the monthly call.
- Provide call summary notes to Recipient of items discussed during call.

The Recipient shall:

- Review the questions provided by CAM prior to the monthly call
- Provide verbal answers to the CAM during the call.

Product:

- Email to CAM concurring with call summary notes.

Subtask 1.6 Quarterly 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 *Quarterly 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 reporting period, 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. Progress reports are due to the CAM the 10th day of each January, April, July, and October. The Quarterly Progress Report template can be found on the ECAMS Resources webpage available at: https://www.energy.ca.gov/media/4691
- Submit a monthly or quarterly *Invoice* on the invoice template(s) provided by the CAM.

Recipient Products:

- Quarterly Progress Reports

- Invoices

CAM Product:
- Invoice template

Subtask 1.7 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 1.7.1 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 Products:
- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.7.2 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 on Draft Final Report* 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 on Draft Final Report
- Draft Final Report
- Written Responses to Comments *(if applicable)*
- Final Report

CAM Product:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBAWARDS

Subtask 1.8 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. 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 <u>no match funds</u> were part of the application 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 application 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 1.9 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 1.10 Obtain and Execute Subawards and Agreements with Site Hosts
The goals of this Subtask are to: (1) procure and execute subrecipients and site host agreements, as applicable, required to carry out the tasks under this Agreement; and (2) ensure that the subrecipients and site host agreements are consistent with the Agreement terms and conditions and the Recipient's own contracting policies and procedures.

The Recipient shall:

- Execute and manage subawards and coordinate subrecipients activities in accordance with the requirements of this Agreement.
- Execute and manage site host agreements, and ensure the right to use the project site throughout the term of the Agreement, as applicable. A site host agreement is not required if the Recipient is the site host.
- Notify the CEC in writing immediately, but no later than five calendar days, if there is a reasonable likelihood the project site cannot be acquired or can no longer be used for the project.
- Incorporate this Agreement by reference into each subaward.
- Include any required Energy Commission flow-down provisions in each subaward, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subaward terms.
- Submit a *Subaward and Site Letter* to the CAM describing the subawards and any site host agreement needed or stating that no subawards or site host agreements are required.
- If requested by the CAM, submit a draft of each *Subaward* and any *Site Host Agreement* required to conduct the work under this Agreement.
- If requested by the CAM, submit a final copy of each executed *Subaward* and any *Site Host Agreement*.
- Notify and receive written approval from the CAM prior to adding any new subrecipient (see the terms regarding subrecipient additions in the terms and conditions).

Products:

- Subaward and Site Letter
- Draft Subawards *(if requested by the CAM)*
- Draft Site Host Agreement *(if requested by the CAM)*
- Final Subawards *(if requested by the CAM)*
- Final Site Host Agreement *(if requested by the CAM)*

TECHNICAL ADVISORY COMMITTEE

Subtask 1.11 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 ensure 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 1.12.

- 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 1.12 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* for each TAC Meeting 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 ensure 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 1.13 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 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.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

IV. TECHNICAL TASKS

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

TASK 2 SIMULATION AND DECISION SUPPORT TOOL

The goal of this task is to develop open-source software and AI-driven decision support tools that can simulate a secondary distribution network.

Subtask 2.1 Line Impedance Simulation

Goal: Develop a tool that can simulate impedance characteristics of a secondary distribution network and use machine learning to suggest the equipment requirements for network mapping.

The Recipient shall:

- Create an open-source software tool that can simulate a secondary distribution network, accounting for line impedance and load in the calculations of voltage amplitude and phase along the entire network.
- Develop several electric load scenarios (between 2-5) based on realistic profiles drawn from homes connected to the network.
- Develop a machine-learning algorithm that can reconstruct the network topology based on waveforms measured at several specific metering points.
- Test the algorithm using the load scenarios and a variety of meter-location scenarios. Determine the algorithm's accuracy subject to variance in load profile and limits in smart-meter availability.
- Summarize the subtask approach and findings in a *Line Impedance Simulation Technical Memorandum*.

Products:

- Line Impedance Simulation Technical Memorandum

Subtask 2.2 Decision Support Tool

Goal: Develop an open-source stakeholder-facing decision support tool that translates LINE capacity inference outputs into actionable information for regulatory, planning, and investment decisions, using a participatory, work-centered design process that emphasizes usability, workflow integration (including regulatory processes), and scalability.

The Recipient shall:

- Conduct early-stage stakeholder engagement (e.g., with utility engineers, distribution planners, regulatory staff, distributed energy resource developers) to identify decision points, preferred metrics, and integration needs.
- Design user interface elements (e.g., maps, visualizations, exportable reports) that align with regulatory reporting requirements and utility planning processes such as distribution planning, load forecasting, and load-add project approval workflows.
- Conduct usability testing with utilities and other stakeholders and refine the tool to improve utility for its intended users. Metrics to test usability include but are not limited to:
    - Avoided project delay durations

    - Cost-per-kW of load enabled
    - Confidence levels in capacity inference
    - Prioritization scores for upgrade projects
- Collect utility data necessary for model development, and develop models for the following Project Metrics:
    - Cost of a load-add project
    - Required service upgrade capacity
    - Time to complete load-add projects
- Compile a *Decision Support Tool Technical Report* that documents the approach and findings as well as documents the tool's design, functionality, stakeholder engagement process, and recommended next steps for broader deployment.

Products:
- Decision Support Tool Technical Report

TASK 3 LABORATORY TESTING OF LINE SMART METER APP
The goal of this task is to containerize selected vendor/subrecipient's smart meter app based on utility use cases and laboratory testing.

Subtask 3.1 Refine LINE App for Utility Use Cases
Goal: Define how to containerize selected vendor/subrecipient's existing smart meter software for utility partner's specific use cases.

The Recipient shall:
- Compile a set of the utility partner's use cases for smart meters and describe the value proposition of smart meters to a utility.
- Define the utility partner's use cases specific to the LINE app and report them to the smart meter vendor's development team.
- Engage in customer discovery with at least two other California utilities to gain insight and feedback about their use cases for the LINE app.
- Develop a block-level description of the app's design that can be made public.
- Define the input, output, and hardware requirements for the LINE app.
- Summarize the subtask work and findings in a *LINE App Design Technical Memorandum* describing the decision-making process and architecture of the app.

Products:
- LINE App Design Technical Memorandum

Subtask 3.2 Develop Laboratory Test Plan
Goal: Develop a laboratory test plan for a realistic set series of experiments that reflect and inform App deployment.

The Recipient shall:
- Define the relevant deployment parameters, including but not limited to the distribution network and expected load of the site(s).
- Define the relevant metrics for validating functionality.

- Create a *LINE App Laboratory Test Plan* that describes the test set up, equipment, and testing procedure.

Products:
- LINE App Laboratory Test Plan

Subtask 3.3 Perform Laboratory Testing
Goal: Test and validate the functionality and accuracy of the smart meter app.

The Recipient shall:
- Perform the laboratory testing as based on the test plan in Subtask 3.2.
- Create a publication-ready *LINE App Testing Whitepaper* based on the results laboratory testing that summarizes the approach, improvements made, and suitability for deployment in utility operations.
- Prepare a *CPR Report #1* and Participate in a CPR meeting in accordance with subtask 1.3 (CPR Meetings).

Products:
- LINE App Testing Whitepaper
- CPR Report #1

TASK 4 FIELD TESTING OF LINE SMART METER APP
The goal of this task is to execute a field test to define the installation and commissioning procedures for the LINE App and to validate its performance and accuracy on utility meters.

Subtask 4.1 Develop Field Test Plan
Goal: Create a field test plan describing the site, data collection, and other considerations in deployment, measurement, and validation.

The Recipient shall:
- Describe the site(s), expected load, and secondary distribution topology.
- Describe the equipment to be deployed, including both smart meters and ancillary equipment if necessary.
- Describe any relevant details about deployment procedure or other considerations.
- Describe the data collection and storage procedure.
- Explain how the data will be used to validate functionality of the LINE app.
- Describe how the team will use the site to test the functionality and accuracy of the LINE concept in scenarios with limited metering.
- Determine how relevant metrics can be calculated with the data.
- Summarize the approach in a *Field Test Plan*.

Products:
- Field Test Plan (Draft and Final)

Subtask 4.2 Deploy and Commission Smart Meters and Ancillary Equipment
Goal: Successfully deploy smart meters with LINE App and any ancillary equipment and commission the deployed equipment to verify functionality.

The Recipient shall:

- Deploy smart meters and ancillary equipment to the field testing site(s).
- Test and commission all hardware, data streams, edge computing, and cloud storage.
- Test and commission the LINE app to verify functionality, accuracy, and determine number of meters necessary.
- Summarize the approach and findings in a *Field Test Deployment Technical Memorandum*.

Products:

- Field Test Deployment Technical Memorandum

Subtask 4.3 Perform Measurement and Verification (M&V) at the Field Test Site

Goal: Collect data from the field test to validate the functionality and performance of the LINE App.

The Recipient shall:

- Perform a manual inspection to measure the capacity and lengths of each wire in the secondary distribution network.
- Iteratively run the LINE app with many combinations of load usage and active or inactive smart meters to record the case combinations and accuracy of the reported network map.
- Compare field test results to lab tests and simulation.
- Calculate and report Project Metrics including but not limited to:
    - Customers engaged to swap meters
    - Number of smart meters necessary
- Compile findings and results from laboratory and field testing in a *Line App Testing Report*.

Products:

- LINE App Testing Report

TASK 5 WIDE AREA DEPLOYMENT OF LINE SMART METER APP

The goal of this task is to evaluate the performance of LINE in a wide-area deployment, validate the Decision Support Tool, and inform the technology transfer and viability of integrating LINE at a programmatic level.

Subtask 5.1 Create Wide Area Test Plan

Goal: Create a test plan that describes data collection, validation, and metrics evaluation processes for wide area testing.

The Recipient shall:

- Describe the deployment region or area including details on customer types and distribution infrastructure characteristics.
- Identify potential challenges or specific steps needed to deploy up to 9,000 smart meters to the identified deployment area.
- Describe how the Decision Support Tool will be used and validated in the wide-area deployment. Validation metrics will be mostly developed in Task 2, but may be influenced by learnings from Tasks 3 and 4.

- Describe the data collection and storage procedure.
- Explain how the data will be used to evaluate the LINE app and Decision Support Tool.
- Check whether utility partner has any documented challenges and lessons learned from similar deployment projects, with the intent of reducing risks to this project and providing contingencies.
- Assess how the deployment's results may impact the utilities at a programmatic level.
- Create a *Wide Area Test Plan*, summarizing the subtask work.

Products:
- Wide Area Test Plan

Subtask 5.2 Wide Area Deployment and Commissioning
Goal: Deploy and commission up to 9,000 smart meters in a wide area to test LINE at a large scale.

The Recipient shall:
- Using guidance from the Decision Support Tool, deploy up to 9,000 smart meters to a region(s) following the methodology defined in Subtask 4.2 and the Field Test Deployment Technical Memorandum.
- Commission the hardware and software following the methodology defined in Subtask 4.3 and the LINE App Testing Report.
- Document any challenges or lessons learned in the installation and commissioning process.
- Summarize the subtask work and findings as a *Wide Area Deployment Technical Memorandum* deliverable.

Products:
- Wide Area Deployment Technical Memorandum

Subtask 5.3 Wide Area Deployment M&V
Goal: Collect results from the wide area deployment to infer the technology transfer and programmatic-level viability of integration of LINE with utility partner(s).

The Recipient shall:
- Evaluate the functionality of the LINE App in a wide-area deployment and document the results including how well they align with existing utility maps or information.
- Evaluate whether the utility partner's engineers can use the data and line-capacity extrapolation gathered from the wide-area deployment.
- Document any challenges and lessons learned.
- Describe if any improvements that are made or required for to the LINE app to be transitioned to a larger market.
- Calculate the meter-to-home-ratio metric, establishing a simple but data-driven rule of thumb for utilities to estimate LINE's deployment cost.
- Evaluate how the wide-area deployment will be viable for the utility partner at a programmatic level and transferable to other utilities.
- Present the findings from Tasks 4 and 5 in a *LINE Deployment Technical Report*.

Products:

- LINE Deployment Technical Report

TASK 6 ELECTRICAL LOAD-ADD PROJECT CASE STUDY

The goal of this task is to demonstrate how LINE will expedite load-add projects in the future.

Subtask 6.1 Integrate App into Engineering Workflow

Goal: Develop a pathway for integrating LINE into the utility partner(s) engineering workflow.

The Recipient shall:

- Conduct internal stakeholder interviews with utility partner staff, which may include engineers, linemen, and strategic personnel.
- From these interviews, determine how the utility partner(s) can integrate LINE app results into their engineering workflow for future load-add projects.
- Create an *Integration Pathway Plan* summarizing these findings.

Products:

- Integration Pathway Plan

Subtask 6.2 Demonstrate LINE with a Load-Add Project

Goal: Successfully demonstrate a load-add project (at a different site), attempting to evaluate wire capacity and phase distribution without a lineman inspection.

The Recipient shall:

- Simulate the network topology with the tool from Subtask 2.1.
- Install LINE-enabled smart meters as necessary within the neighborhood site.
- Characterize the network and line capacity.
- Validate the line capacity with a lineman inspection if required by regulatory or other factors.
- Successfully give the load-add project permission to operate.
- Calculate the following Project Metrics:
  - Cost of a load-add project using LINE (compare to manual inspection, possibly using Decision Support Tool)
  - Required service upgrade capacity
  - Time to complete load-add projects using LINE (compared to manual processes, possibly using Decision Support Tool)
- Summarize the subtask work and findings as a *Load-Add Case Study Technical Memorandum* deliverable.
- Prepare a *CPR Report #2* and participate in a CPR meeting in accordance with subtask 1.3 (CPR Meetings).

Products:

- Load-Add Case Study Technical Memorandum
- CPR Report #2

TASK 7 OUTREACH AND USE CASE DEVELOPMENT

The goal of this task is to inform and refine the value proposition of smart meter adoption to individual utility customers including through community outreach.

Subtask 7.1 Smart Meter Use Case Development
Goal: Develop customer-side use cases for smart meters and LINE.

The Recipient shall
- Engage utility customers, project developers, and other stakeholders on the value of smart meters and secondary distribution mapping.
- Compile interview findings into a set of specific use cases for each category of stakeholder.
- Develop materials targeted to utility customers, highlighting the value of switching to a smart meter.
- Summarize the subtask work and findings in a *Customer Use Case Technical Memorandum*.

Products:
- Customer Use Case Technical Memorandum

Subtask 7.2 Customer Outreach
Goal: Disseminate materials articulating the value of smart meters to utility customers to inform future deployment plans.

The Recipient shall:
- Engage at least 30 customers in a discussion about smart meters including their value and concerns about their adoption.
- Calculate the following Project Metrics:
  - Customers engaged to swap meters
- Compile outreach findings and make recommendations to utility partners on how to best engage customers on smart meters.
- Compile a *Customer Outreach Technical Report* that documents the work and findings from the entire task. The Customer Outreach Technical Report will also include the Customer Use Case Technical Memorandum (Subtask 7.1).

Products:
- Customer Outreach Technical Report

TASK 8: EVALUATION OF PROJECT BENEFITS
The goal of this task is to report the benefits resulting from this project.

The Recipient shall:
- Complete *the Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with ‘Kick-off’ selected for the ‘Relevant data collection period’ and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by 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), 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), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

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

TASK 9: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient Shall:

- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The Project Case Study Plan should include:
  - An outline of the objectives, goals, and activities of the case study.
  - The organization that will be conducting the case study and the plan for conducting it.
  - A list of professions and practitioners involved in the technology's deployment.
  - Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners.
  - Presentations/webinars/training events to disseminate the results of the case study.
- Present the draft *Project Case Study Plan* to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the draft *Project Case Study Plan*. This document will identify:
  - TAC comments the Recipient proposes to incorporate into the final *Technology Transfer Plan*.

    - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Submit the final *Project Case Study Plan* to the CAM for approval.
- Execute the final Project Case Study Plan and develop and submit a Project Case Study.
- When directed by the CAM, develop presentation materials for a CEC sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California CEC.
- Provide at least (6) six High Quality Digital Photographs (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:
- Project Case Study Plan (draft and final)
- Summary of TAC Comments
- Project Case Study (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.