California Energy Commission
October 18, 2023 Business Meeting
Backup Materials for Agenda Item No 13:
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

RESOLUTION NO: 23-1018-13

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: **Lawrence Berkeley National Laboratory**

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-23-017 with Lawrence Berkeley National Laboratory for a $1,200,000 grant to investigate the social and economic costs of long duration widespread power outages on disadvantaged vulnerable communities as defined in the California Public Utilities Commission climate adaptation rulemaking. The project will estimate previously undercounted costs of these power outages and support integration of these costs in assessing the value of utility investments in increased resilience; 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 October 18, 2023.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

____
Kristine Banaag
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 9/2022)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

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

New Agreement Number: EPC-23-017

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Mithra Moezzi
3. MS-: 51
4. Phone Number: 916-891-8619

C. Recipient's Information

1. Recipient's Legal Name: Lawrence Berkeley National Laboratory
2. Federal ID Number: 94-2951741

D. Title of Project

Title of project: Estimating the Economic, Health, and Safety Benefits of Avoiding Long-duration Power Disruptions in Disadvantaged Communities

E. Term and Amount

1. Start Date: 11/1/2023
2. End Date: 12/31/2026
3. Amount: $1,200,000.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 10/18/2023.
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Mithra Moezzi
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: EPIC (Electric Program Investment Charge).

Agenda Item Subject and Description:

Lawrence Berkeley National Laboratory.
Proposed resolution approving agreement EPC-23-017 with Lawrence Berkeley National Laboratory for a $1,200,000 grant to investigate the social and economic costs of long duration widespread power outages on disadvantaged vulnerable communities as defined in the California Public Utilities Commission climate adaptation rulemaking, and adopting staff's determination that this action is exempt from CEQA. The project will estimate previously undercounted costs of these power outages and support integration of these costs in assessing the value of utility investments in increased resilience. (EPIC Funding) Contact: Mithra Moezzi (Staff Presentation: 5 minutes)

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

<u>Statutory Exemption?</u>
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

<u>Categorical Exemption?</u>
No

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

CCR section number: None

<u>Common Sense Exemption? 14 CCR 15061 (b) (3)</u>
Yes

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

Cal. Code Regs., tit. 14, Section 15306 provides that projects which consist of basic data collection, research, experimental management, and resource evaluation activities, and which do not result in a serious or major disturbance to an environmental resource are categorically exempt from the provisions of the California Environmental Quality Act. This project involves data gathering and paper studies within existing offices and labs. The project also includes conducting surveys of electric utility customers both on-line and in person at the customers' residences or businesses.

The project will not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies; does not involve any cumulative impacts of successive projects of the same type in the same place that might be considered significant; does not involve unusual circumstances that might have a significant effect on the environment; will not result in damage to scenic resources within a highway officially designated as a state scenic highway; the project site is not included on any list compiled pursuant to Government Code section 65962.5; and the project will not cause a substantial adverse change in the significance of a historical resource. Therefore, none of the exceptions to categorical exemptions listed in CEQA Guidelines section 15300.2 apply to this project, and this project will not have a significant effect on the environment.

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. 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
Resource Innovations, LLC	$ 75,000	$0
GRID Alternatives	$ 75,000	$0
Indicia Consulting LLC	$ 90,000	$0
Alan Sanstad	$ 75,000	$0

I. 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
No vendors to report	**$**	**$**

J. 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
United States Department of Energy

K. 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	21-22	301.001I	$ 1,200,000

TOTAL Amount: $ 1,200,000

R&D Program Area: EGRB: EA

Explanation for “Other” selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

L. 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

3. Recipient’s Project Manager

Name: Max Wei

Address: 1 Cyclotron Rd., MS 90R2002

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

Phone: 510-486-5220

E-Mail: MWei@lbl.gov

M. Selection Process Used

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

Selection Process	Additional Information
Competitive Solicitation #	GFO-22-302
First Come First Served Solicitation #	Not applicable
Other	Not applicable

N. 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: Mithra Moezzi

Approval Date: 9/13/2023

Branch Manager: Daphne Molin (for Kevin Uy)

Approval Date: 9/13/2023

Director: Delegated to Branch Manager

Approval Date: N/A

Exhibit A
Scope of Work
Lawrence Berkeley National Laboratory

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Risk Assessment and Framework Development
3	X	Focus Groups and Surveys with DVC Residents
4		Interviews with Non-residential Organizations in DVCs
5		Economic Impact Modeling and Customer Damage Function Development
6		Dissemination of Project Results
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBO	Community Based Organization
CEC	California Energy Commission
CPR	Critical Project Review
CPUC	California Public Utilities Commission
DAC	Disadvantaged Community
DVC	Disadvantaged Vulnerable Community
ICE	Interruption Cost Estimate tool (LBNL tool)
IOU	Investor-Owned Utility
LBNL	Lawrence Berkeley National Laboratory
LDWI	Long-Duration, Widespread Power Interruptions
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 development and demonstration of a resilience valuation framework that extends the conventional cost-benefit framework to more fully capture quantitative and qualitative health and safety value streams in Disadvantaged Vulnerable Community (DVCs).

[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.

B. Problem/ Solution Statement

Problem
In April 2022, the California Public Utilities Commission (CPUC) released an updated Environmental and Social Justice Action Plan (CPUC 2022). The fourth goal identified in the plan involves, "increasing climate resiliency in Environmental and Social Justice communities" (CPUC 2022). The preceding framework suggests prioritizing investments in Disadvantaged Vulnerable Communities (DVCs) that improve community health and safety and lead to other benefits, including cost savings.

The threat of long-duration, widespread power interruptions (LDWIs) is expected to increase in the future with more intense heat, greater wildfire risk, and higher electricity demands due to widespread electrification putting more demands on the electricity grid. Unfortunately, there has been a general shortfall of information detailing the costs of LDWIs, or the social value of investments that mitigate these types of interruptions. Thus, there is an urgent need to better understand the general impacts of LDWIs, and specifically how investments in improving resilience in DVCs can lead to more equitable distribution of energy resilience in the state.

Solution
A key advantage to our proposed approach is that it will ultimately increase the likelihood that DVCs will receive a relatively larger share of utility investments in resilience than in the past. This likely increase is primarily due to (1) the incorporation of additional value streams into the decision-making process and (2) a recalibration of the assumed values of lost load experienced in DVCs.

First, we are proposing that avoided mortality costs, morbidity costs, and indirect economic impacts be incorporated into the criteria that utilities use to justify future investments. It has been shown that DVCs may be more at risk to the effects of climate change, including the impacts of LDWIs and heat waves (Rhoades 2022). For this reason, we intend to include questions about community health and safety using hypothetical interruption scenarios. We will revise existing surveys to incorporate health/safety risks, including questions about medical devices; whether they have suffered from health problems related to power disruptions (such as carbon monoxide poisoning, temperature-related illness, gastrointestinal illness, and mortality); and what different types of investments and adaptation measures they would like to implement to mitigate the impacts of power interruptions with different duration, geographic conditions, and weather conditions.

This information can then be used to provide the basis for monetizing these impacts and ultimately include them into a decision-making framework for resilience investments. A recent study suggested that DVCs are often co-located in places where there is a relatively higher share of commercial and heavy industrial activities (CalEnviroScreen 2023). Accounting for the spillover or indirect effects of LDWIs to these businesses will increase the value proposition of proposed investments in DVC resilience.

Second, in consultation with a social scientist, we will be adjusting the residential interruption cost survey instruments to address the downward "bias" present in questions that ask customers about their willingness-to-pay for a hypothetical backup service during a power interruption. DVC respondents, who may be living in poverty, may indicate that they are willing to pay a lower amount than wealthier respondents–due to their severe income constraints. We will explore alternative ways of asking these valuation questions, including willingness-to-accept or other approaches, to account for this effect. Focus groups and individual interviews will explore the contextual "lived experience" of residents to develop a better understanding of what happens to residents during power outages. The focus groups will also inform the development of decision-support indices, such as a Community Support Index, Energy Affordability Index, and a Sustainability Index. We may also conduct focus groups to review the non-residential survey questions.

The combination of incorporating additional value streams and addressing the downward bias present in traditional value of lost load surveys will extend current methodologies for estimating the value of electricity system resilience beyond economic valuations based on willingness-to-pay survey questions, and include a better understanding of underlying social factors, health impacts, and community-based indices (e.g., metrics based on support services, accessibility, and affordability). This work will likely lead to a fundamental reprioritization of utility and distributed resource investments, and increase distribution of resilience investments towards DVCs, thereby increasing their adaptive capacity.

C. Goals and Objectives of the Agreement

Agreement Goals
The goals of this Agreement are to:

- Develop and demonstrate a resilience valuation framework that extends the conventional cost benefit framework to more fully capture quantitative health, safety, and economic value streams as well as more qualitative health, safety, and social impacts in DVCs that could later be readily adapted to the general population.
- Develop and demonstrate widely applicable data collection and assessment methods to inform health and safety value streams from climate-induced hazards and risks.
- Provide a framework that can broadly inform the design, development, and selection of resilience and reliability measures.
- Be complementary to future customer interruption cost surveying of the general population undertaken by LBNL as part of CPUC Decision 22-12-027.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefit of greater resilience to LDWIs in DVC areas resulting from more resilience investments in these areas.

The successful completion of this project will lead to a fundamental re-prioritization of resilience investments towards DVCs. It is possible to speculate on the increased investment levels that may occur. The prospective improved accounting of LDWI impacts to DVC residents implied by this re-prioritization could increase the disruption costs of these customers to nearly $97 million in 2021 – an increase of ~$54.6 million from the default accounting framework. These estimates represent an upper bound of the power system investments serving residential customers in

[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).

DVCs before and after this project.[3] Summing this nearly ~$55 million annual difference in investment levels over a 20-year planning horizon and discounting it back to the present yields a ~$619 million benefit that could be attributed to the successful completion of this project.

<u>Technological Advancement and Breakthroughs</u>:[4] 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 developing estimates for four quantitative valuation streams in DVCs due to LDWIs (direct economic losses, indirect economic losses, excess mortalities, and excess morbidities) as well as a set of qualitative indices for community impacts and other health and safety losses beyond mortalities and morbidity.

Key outreach and data collection approaches will include (1) focus groups with DVC residents; (2) designing and administering state-of-the-art surveys in each focal area to estimate the economic impacts of LDWIs; (3) individual interviews with local business and industrial facility owners or managers; (4) and individual interviews with health and safety officials, and local focal community leaders such as school officials and city council members. Focus groups with public health and safety officials will assist with monetizing the morbidity and mortality costs associated with these types of power interruptions. We will employ a regional economic model to evaluate the spillover effects to businesses who may still have power, but are reliant on businesses and consumers who do not have power. We will also identify a range of customer resilience/adaptation strategies, estimate their capital as well as operations and maintenance costs, and show the resultant value streams for either past LDWI events or scenario-based example events.

<u>Agreement Objectives</u>
The objectives of this Agreement are to:

- Review past extreme weather events, power disruptions, and decisions to enhance resilience (or adaptive capacity) in DVCs.
- Identify frameworks and metrics that are relevant for assessing the economic and social value of resilience investments in DVCs that are not currently monetized.
- Develop survey instruments that are appropriate for administration to electricity customers in DVCs.
- Conduct focus groups with DVC customers to adjust survey instruments, as needed.
- Survey residential and interview non-residential DVC customers to assess their (1) existing adaptive capacity; (2) the direct economic impacts of LDWIs; and (3) morbidity and mortality costs of these power interruptions.
- Run a regional economic model to assess the indirect (i.e., spillover) effects of LDWI
- Produce scenario-based, technology-specific estimates of the costs as well as the economic and social value of resilience investments in DVC counties building upon previous LBNL tools.
- Disseminate the results to utilities, regulators, technology providers, DVC organizations, and other stakeholders to increase investments in resilience thus "leveling the playing field" for communities that have not traditionally received significant investments.

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[3] Avoiding the cost of power disruptions is a key benefit in the value proposition for new investments in power system reliability (resilience).
[4] California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

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:

<u>For products that require a draft version, including the Final Report Outline and Final Report</u>

- 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.

<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, the Commission Agreement Officer (CAO), and any other CEC staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The <u>administrative portion</u> of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - Match fund documentation (subtask 1.7);

- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:
- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;
- Technical products (subtask 1.1);
- Progress reports (subtask 1.5);
- Final Report (subtask 1.6);
- Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
- Any other relevant topics.

- Provide *Kick-off Meeting Presentation* to include but not limited to:
  - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
  - Project schedule that identifies milestones
  - List of potential risk factors and hurdles, and mitigation strategy

- Provide an *Updated Project Schedule, Match Funds Status Letter,* and *Permit Status Letter*, as needed to reflect any changes in the documents.

The CAM shall:
- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

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

CAM Product:
- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings
The goal of this subtask is to determine if the project should continue to receive CEC funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the CEC and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient and may include the CAO and any other individuals selected by the CAM to provide support to the CEC.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the CEC, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

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(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 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:
- Conduct a monthly call with the CAM and submit a *Monthly Call Form* using the ECAMS template posted on the CEC's ECAMS Resources page.
- Submit quarterly *Progress Reports* using the template provided by the CAM. The quarterly progress reports 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.
- Submit a monthly or quarterly *Invoice*, as agreed upon with CAM, 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:
- Monthly Call Forms
- Progress Reports
- Invoices

Subtask 1.6 Final Report
The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:
- Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

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

CAM Product:
- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:
- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)
    - Acknowledgements page (optional)
    - Preface (**required**)
    - Abstract, keywords, and citation page (**required**)
    - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
    - Executive summary (**required**)
    - Body of the report (**required**)
    - 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 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 <u>no match funds</u> were part of the proposal that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

  If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

    - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:
- Match Funds Status Letter
- Supplemental Match Funds Notification Letter *(if applicable)*
- Match Funds Reduction Notification Letter *(if applicable)*

Subtask 1.8 Permits
The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:
- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
    - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
    - The schedule the Recipient will follow in applying for and obtaining the permits.

  The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits *(if applicable)*
- Updated Schedule for Acquiring Permits *(if applicable)*
- Copy of Each Approved Permit *(if applicable)*

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

- Subcontracts *(draft if required by the CAM)*

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
  - Technical area expertise;
  - Knowledge of market applications; or
  - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.

- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support, and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings
The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:
- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project’s strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

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

Subtask 1.12 Project Performance Metrics
The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology’s potential success.

The Recipient shall:
- Complete and submit the project performance metrics 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

TECHNICAL TASKS

TASK 2: Risk Assessment and Framework Development
The goals of this task are to provide a risk assessment for factors contributing to long-duration power outages, and to develop an expanded resilience framework beyond traditional cost-benefit frameworks focusing on the impacts of long-duration power outages in DVC areas.

The Recipient shall:
- Explore, with the CEC, whether investor-owned utilities could provide more granular level information, and pursue obtaining and analyzing this data to the extent feasible. Include details on outage causes as available. If not, explore alternatives that may yield data on past outages that are mappable to tract-level or other sub-county geographies, or default to county-level aggregation where specified below. To the extent data disclosure agreements and applicable laws, regulations, and standards, allow, provide *Power Outage Data Sets* to the CEC.
- Identify LDWIs that have affected California during the last 20 years using data from form DOE-417 “Electric Emergency Incidents and Disturbance Report.”
- Analyze utility-level interruption data for California counties for the years 2017 through 2021 from the PowerOutages.us dataset to characterize the duration, frequency, and timing of interruptions events for every county in California.
- Summarize outage data from other sources such as correlated information on weather, PSPS warnings, CAISO flex alert warnings, and actual notifications.
- Map DVC census tracts by location and population and highlight those DVC locations and populations in close proximity to high fire risk districts.
- If sub-county data are available, highlight differences between incidence of historical outages in DAC areas (as defined by the 2023 or later version of CalEnviroScreen) and risks in tribal and very low-income census tract DVC areas as defined by the 2019 CPUC rulemaking (CPUC 2020) and between urban and rural areas.
- In project *Progress Report(s)*, provide quantitative and geographic summaries of the above outage data and analyses, including with sub-county data if it is obtained.

- Assess factors that contribute to long-duration power outages such as future electricity demands and their location, future risks of wildfires and Public Safety Power Shutoffs (PSPS) outages (including high wind and dryness events), and future risk of more frequent, intense, and longer duration heat waves.
- Review literature including past state climate assessments, wildfire risk assessments from the Energy Commission and other sources, heat wave projections, heat wave excess mortality projections.
- Write *An Expanded Resilience Framework for Power Outages in Disadvantaged Communities Memo* describing the expanded resilience framework.

Products:

- Risk Assessment and Framework Development Memo (draft and final)
- An Expanded Resilience Framework for Power Outages in Disadvantaged Communities Memo (draft and final)
- Power Outage Data Sets (to the extent data disclosure agreements allow)

TASK 3: Focus Groups and Surveys with DVC Residents

The goals of this task are to develop survey instruments that are appropriate for administration to electricity customers in DVCs, and to survey residential customers to assess their (1) existing adaptive capacity; (2) direct economic impacts; and (3) morbidity and mortality costs of long-duration, LDWI.

Task 3.1 Design and Conduct Focus Groups

The Recipient shall:

- Define the study focal areas; preliminary research suggests Eureka/Arcata and Hemet.
- Define appropriate non-disclosure agreements and protocols for data sharing and data security, with consideration of the goal of providing the Energy Commission with adequate detail from data collection insofar as permitted according to the LBNL Human Subjects Committee review.
- Maintain full compliance with the California Information Practices Act at Civil Code 1798 et seq (IPA).[5]

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[5] The full IPA can be found here: https://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=CIV&division=3.&title=1.8.&part=4.&chapter=1.&article
Research involving human subjects or human derived data or tissues must be reviewed by an Institutional Review Board (IRB) as required by 45 CFR Part 46. At LBNL, the IRB is called the Human Subjects Committee (HSC). All human subjects research performed at or funded through the Laboratory, or conducted off-site by Laboratory staff/affiliate/subcontractors, shall be subject to LBNL HSC review without exception, and shall not be performed unless approved by the HSC. The requirement for a review by the HSC cannot be replaced by IRB approval attained by other collaborating institutions unless approved by the HSC. All work involving human participants and data must follow the approved protocol. Any changes to the approved protocol shall be communicated to the HSC through the amendment process and the proposed changes should not be conducted until approved by the HSC. Before initiating a review process, all researchers and staff who are planning to conduct human subjects study must complete a training requirement on human subjects research.

- In consultation with CAM, contact a target number of 1,400 residential contacts total (or 700 per focal area), aiming for a final sample of 100 per focal area.
- Develop the *Focus Group Script* to (1) help to prioritize and refine the residential survey questions and (2) elicit inputs on community impacts to inform the development of supporting decision indices (such as a Community Support Index, Energy Affordability Index, and a Sustainability Index).
- Conduct four focus groups (two in each focal area) and help ensure that surveys are tailored to California DVC residents; each focus group will have about 20-25 participants.
- Prepare *CPR Report #1* and participate in CPR meeting per subtask 1.3.

Products:
- Focus Group Script
- CPR Report #1

Task 3.2: Design Survey Instrument and Conduct Survey

The Recipient shall:
- Develop a *Residential Survey Instrument*, which contains the survey questions to be administered online with residential customers, along with fielding and implementation protocols, that are appropriate for administration to electricity customers in DVCs.
- Provide the *Draft Residential Survey Instrument* in a Quarterly Progress Report and the final version as an appendix to the project Final Report.
- Test and implement the online survey.
- Following fielding contacts and other protocols identified in the Sampling Plan (Task 3.1) insofar as possible, collect a target of 200 completed surveys (or 100 in each focal area) from either the online survey or telephone interviews. In the project Progress Report(s), briefly summarize survey fielding process, disposition results, and response rates.
- Compile a *Focus Groups and Surveys with DVC Residents Memo*, describing the activities for Task 3 in this scope of work, to include the process of recruitment and updating survey for DVCs, as well as analysis of focus group and survey results.

Products:
- Focus Groups and Surveys with DVC Residents Memo (draft and final)
- Residential Survey Instrument (draft and final)

TASK 4: Interviews with Non-Residential Organizations in DVCs

The goal of this task is to interview non-residential DVC customers to assess their (1) existing adaptive capacity; (2) direct economic impacts; and (3) morbidity and mortality costs of long-duration, LDWI, with consideration of major uncertainties and dependencies surrounding these estimates.

The Recipient shall:

- Define appropriate non-disclosure agreements and protocols for data sharing and data security.

- Maintain full compliance with the California Information Practices Act at Civil Code 1798 et seq (IPA).[6]
- Develop a sampling plan outlining the different types of non-residential organizations, and representatives within these organizations, to be interviewed.
- Develop interview scripts to incorporate new interruption scenarios with tailored scripts for different sets of interviewees and varying socio-demographic backgrounds and professional specialties (e.g., 2-3 scripts for different sets of interviewees across public health and safety, and community leaders).
- Develop interview scripts for health and safety professionals and community leaders to include important health impacts of LDWIs such as carbon monoxide poisoning, temperature-related illness, and gastrointestinal illness.
- Contact a target number of 200 representative commercial or industrial electricity customers (or 100 in each focal area).
- Target a completion of 20 interviews with commercial or industrial customers (or 10 in each focal area).
- Contact a target number of 60 representative (or 30 per focal area) health and safety organizations and community influencers, such as pastors/imams/school leaders.
- Target a completion of 20 interviews with health/safety officials and community leaders (or 10 in each focal area).
- Compile an *Interviews with Non-Residential Organizations in DVCs Memo*, describing the activities in this Task 4, including interview scripts, the process of recruitment, and a summary of interview results.
- Provide *Interview Scripts* as an appendix in the project final report.

Products:
- Interviews with Non-Residential Organizations in DVCs Memo (draft and final)
- Interview Scripts

TASK 5: Economic Impact Modeling and Customer Damage Function Development

The goal of this task is to produce scenario-based, technology-specific estimates of the economic and social value of resilience investments in DVC counties.

The Recipient shall:

- Collect and summarize past health and safety data from public health agencies, hospitals, police/fire departments and plan outreach and data collection in two focal areas with people, businesses and organizations.
- Summarize outreach data and key findings from surveys, focus groups, and individual interviews.
- Estimate direct economic costs of power interruptions building upon past methods used by the research team.
- Translate outreach data above on health and safety into morbidity- and mortality-related costs.
- Develop qualitative decision indices, which may include community, equity, and environmental indices such as Community Support Index, Energy Affordability Index,

[6] Ibid.

and Sustainability Index. Summarize development in a memo or slide deck on *Qualitative Decision Indices*.

- Run a regional economic model to quantify the indirect economic impact of LDWIs in the two DVC focal areas.
- Estimate customer damage functions for direct economic damages, indirect economic costs, and health and safety costs due to increases in morbidity and mortality.
- Update and refine the matrix of resilience enhancing strategies from LBNL's FRONTIER project in consultation with the CAM and TAC.
- Estimate resultant value streams from a range of customer resilience/adaptation strategies for either past LDWI events or scenario-based example events, based on recommendations from the CAM and TAC.
- Memo on *Economic Impact Modeling and Customer Damage Function Development.*

Products:

- Memo on Economic Impact Modeling and Customer Damage Function Development
- Memo or slide deck on Qualitative Decision Indices (draft and final)

TASK 6: Dissemination of Project Results

The goal of this task is intended to immediately inform mid- and long-term planning decisions by utilities and other stakeholders, such as other researchers, technology developers, relevant non-governmental organizations, and local and state governments. For example, one key deliverable from this project includes resilience-enhancing technology costs (i.e., capital as well as operations and maintenance costs of technologies/strategies) and benefits (i.e., avoided economic, morbidity, and mortality costs) under a range of disruption scenarios.

The Recipient shall:

- Document existing decision-making frameworks used by investor-owned utilities to justify investments in reliability and resilience.
- Capture recommendations for additional value streams that should be considered, especially for investments targeting DVCs. These additional value streams will include, but not be limited to, DVC-specific avoided economic, morbidity, and mortality costs from proposed investments in the power system. In the final report, summarize these recommendations and their development.
- Generate an *Expanded Resilience Framework for Power Outages in Disadvantaged Communities Presentation* for use in a webinar. Summarize results in project Progress Report(s).
- Share the results of our research with the Technical Advisory Committee and a broader community of stakeholders via webinars, in-person presentations, and on-demand video presentations.

Products:

- Expanded Resilience Framework for Power Outages in Disadvantaged Communities Presentation

TASK 7: EVALUATION OF PROJECT BENEFITS *(Mandatory task)*

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 8 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to ensure the scientific and techno-economic analysis and tools developed under this agreement are utilized in the energy policy, and/or planning decisions at the state and/or local levels, academic community and/or commercial sector.

The Recipient Shall:

- Develop and submit a *Knowledge Transfer Plan* that identifies the proposed activities the recipient will conduct to meet the goal of the task. The *Knowledge Transfer Plan* should include at a minimum:
    - Specific policy and planning efforts this project is expected to inform.
    - Specific stakeholder groups and energy policy and planning practitioners who will utilize the results of this project.
    - Proposed activities the recipient will conduct to ensure the tools and results from this project will be utilized and adopted by the groups identified above.
- Present the *Draft Knowledge 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 Knowledge Transfer Plan*. This document will identify:
    - TAC comments the recipient proposes to incorporate into the *Final Knowledge Transfer Plan*.
    - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the *Final Knowledge Transfer Plan* to the CAM for approval.
- Implement the activities as described in the *Final Knowledge Transfer Plan.*
- Develop a *Knowledge Transfer Summary Report* 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 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:

- Knowledge Transfer Plan (draft and final)
- Summary of TAC Comments
- Technology Transfer Summary Report (draft and final)
- High Quality Digital Photographs

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.