STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019) CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC-19-018

B) Division	Agreement Manager:	MS-	Phone
ERDD	Katharina Gerber	43	916-327-2201

C) Recipient's Legal Name	Federal ID Number
Hell's Kitchen Geothermal LLC	81-1914243

D) Title of Project
Hell's Kitchen Geothermal Lithium Extraction Pilot

E) Term and Amount

Start Date	End Date	Amount
6/15/2020	6/30/2023	$ 1,460,735

F) Business Meeting Information

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

Proposed Business Meeting Date 5/13/2020 ☐ Consent ☒ Discussion

Business Meeting Presenter Chuck Gentry Time Needed: 5 minutes

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

Agenda Item Subject and Description:

HELL'S KITCHEN GEOTHERMAL LLC. Proposed resolution encumbering $1,460,735, approving Phase I of Agreement EPC-19-018 with Hell's Kitchen Geothermal, LLC, and adopting staff's determination that Phase I is exempt from CEQA. Phase I will design a pilot-scale process for pre-treatment of geothermal brine to prepare the brine for lithium extraction. Activities include the pilot plan design and plan to procure materials and services to construct and operate the facility as well as obtaining approvals from the lead agency to comply with CEQA for Phase II. If approved at a future Business Meeting at which the lead agency's CEQA actions for Phase II are considered, Phase II involves constructing the facility, commissioning and operating the facility, and collecting data on project activities. The grant recipient is not authorized to expend funds or perform work on Phase II until and if the Energy Commission approves it at a future Business Meeting.

G) California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
   ☒ Yes (skip to question 2)
   ☐ No (complete the following (PRC 21065 and 14 CCR 15378)):

   Explain why Agreement is not considered a "Project":

2. If Agreement is considered a "Project" under CEQA:
   a) ☒ Agreement **IS** exempt.
      ☐ Statutory Exemption. List PRC and/or CCR section number:
      ☒ Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, § 15306
      ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

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 a serious or major disturbance to an environmental resource and conducted strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded are categorically exempt from the provisions of the California Environmental Quality Act. Activities that will be performed under Phase I of the agreement include the pilot plan design and plan to procure materials and services to construct and operate the facility as well as obtaining approvals from the lead agency to comply with CEQA. For these reasons, the proposed work will not have any significant effect on the environment and falls under section 15306.

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

Check all that apply

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

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

Legal Company Name:	**Budget**
See attached	$

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

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	18-19	301.001F	$1,460,735

R&D Program Area: EGRO: Renewables TOTAL: $ 1,460,735

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Jason Czapla
Address: 447 W Aten Rd Ste G
City, State, Zip: Imperial, CA 92251-9713
Phone: 442-202-9605
E-Mail: jason.czapla@cthermal.com

2. Recipient's Project Manager

Name: Jason Czapla
Address: 447 W Aten Rd Ste G
City, State, Zip: Imperial, CA 92251-9713
Phone: 442-202-9605
E-Mail: jason.czapla@cthermal.com

L) Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-19-303

☐ First Come First Served Solicitation #:

M) The following items should be attached to this GRF

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

_____ _____
Agreement Manager **Date**

_____ _____
Office Manager **Date**

_____ _____
Deputy Director **Date**

Exhibit A
Scope of Work

I. TASK ACRONYM/TERM LISTS

- **Task List**

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Develop Process Design Criteria
3	X	Design Pilot Plant
4	X	Construction and Procurement Plan
5	X	Procure and Construct Pilot Plant
6	X	Operate Pilot plant
7		Post Operation Analysis and Evaluation
8		Techno-Economic Assessment
9		Evaluation of Project Benefits
10		Technology/Knowledge Transfer Activities
11		Production Readiness Plan

- **Acronym/Term List**

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
EV	Electric Vehicle
Recipient	Hell's Kitchen Geothermal, LLC
IOU	Investor Owned Utility
LBNL	Lawrence Berkley National Labs
MW	Megawatt
MWhr	Megawatt hour
PEA	Preliminary Economic Assessment
SDSU	San Diego State University
TAC	Technical Advisory Committee

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

- **Purpose of Agreement**

The purpose of this Agreement is to design and demonstrate a pretreatment process for geothermal brine at Recipient's project site in Imperial County. The constructed brine pre-treatment unit will enable removal of silica and heavy metals from geothermal fluid and precondition the brine for subsequent extraction of lithium.

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

Exhibit A
Scope of Work

- **Problem/ Solution Statement**

Problem
Since 1982 many technical teams have explored the feasibility of lithium extraction from geothermal brine with some projects being more successful than the others. However, none of these efforts has resulted in demonstration of commercial viability of lithium extraction from geothermal brine. Thus, due to the perceived risk, no investors or potential off-takers have been willing to fund such projects on a pilot-scale.
Geothermal brines can be a challenging source for lithium because of their complicated geochemistry and high corrosive potential. In particular, the Salton Sea Geothermal Field contains a large amount of lithium, yet, at the same time it also contains large amounts of other chemical elements that make selective extraction difficult.

Solution
The Recipient will design a pre-treatment process based on the chemical composition of the geothermal fluids at the project site and demonstrate its technical performance on a pilot-scale. The developed process will provide a path to a technically feasible lithium extraction process with favorable commercial scale economics.

- **Goals and Objectives of the Agreement**

Agreement Goals

The goals of this Agreement are to:

- Determine the exact chemical composition of geothermal brine at the HKG's site.
- Design, construct and test a pilot scale process for removal of impurities, such as silica and heavy metals, from the geothermal fluid based on the chemical composition of the brine.
- Gather scaling factors to assist in design of larger scale demonstration/commercial plants.
- Provide techno-economic assessment for commercial scale operations.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of greater electricity reliability and lower costs.

The Recipient, with help from partners, created a detailed financial model for a combined geothermal power plant and lithium production plant. The model is based upon a 140MW power plant and two 19,000 tons per year lithium production plants utilizing commercially available lithium extraction technology. The model can determine what minimum electricity price a project is able to maintain financial obligations and attract investment. HKG's analysis of integrating lithium and power projects allows geothermal electricity to be sold at ~$50/MWhr. This is a

[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, CPUC rulemaking 11-10-003).

substantial savings compared to most geothermal power purchase agreements. Integrated geothermal and lithium production could save ratepayers ~35% on electricity purchased from geothermal.

Decreasing the cost of geothermal energy will allow Investor Owned Utilities (IOU) to procure greater amounts of geothermal energy and still provide cost effective solutions to rate payers. This will allow the IOU's to procure more inertia-based power that provides grid benefits and capacity.

Technological Advancement and Breakthroughs:[3] 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 paving the path to the establishment of a stable, secure, low-cost source of lithium needed to manufacture lithium-ion batteries. A supply of lithium-ion batteries is paramount to the state of California achieving its renewable energy goals as increased energy storage systems will be required to integrate intermittent generation sources like wind and solar.

A supply of lithium will also be necessary to support the emerging electric vehicle (EV) industry, which in return will support the decarbonization of the transportation sector and reduce the amount of associated greenhouse gas emissions. Current lithium production globally is ~300,000 tons per year. However, demand is forecast to outstrip current supply by 2- or 3-fold in the next decade. It is critical for manufacturers of EV batteries to have reliable supply of affordable lithium.

Agreement Objectives

The objectives of this Agreement are to:

- Produce equipment scaling factors necessary for designing commercial size equipment.
- Achieve steady-state, uninterrupted operation of brine pre-treatment facility for at least 600 hours.
- Confirm process design criteria.
- Refine reagent consumption factors.
- Produce pretreatment precipitate and establish pretreatment product composition that can be used to seek commercial end users.
- Calibrate mass and energy balance.
- Confirm efficiency of impurities removal.
- Complete techno-economic assessment validating operating and capital cost estimate for commercial plant.

[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.

Exhibit A
Scope of Work

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).** Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.

- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.

- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

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

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:

    - **Electronic File Format**

        1. Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission's 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 or CD-ROM.

The following describes the accepted formats for electronic data and documents provided to the Energy Commission as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

2. Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
3. Text documents will be in MS Word file format, version 2007 or later.
4. Documents intended for public distribution will be in PDF file format.
5. The Recipient must also provide the native Microsoft file format.
6. 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:

7. Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
8. Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
9. Visual Studio.NET (version 2008 and up). Recommend 2010.
10. C# Programming Language with Presentation (UI), Business Object and Data Layers.
11. SQL (Structured Query Language).
12. Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
13. Microsoft SQL Reporting Services. Recommend 2008 R2.
14. 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 Energy Commission'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 Energy Commission staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:
- Terms and conditions of the Agreement;
- 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 and invoices (subtask 1.5);
- Final Report (subtask 1.6);
- Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
- Any other relevant topics.

- Provide an *Updated Project Schedule, List of Match Funds,* and *List of Permits*, 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:
- Updated Project Schedule *(if applicable)*
- Updated List of Match Funds *(if applicable)*
- Updated List of Permits *(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 Energy Commission 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 Energy Commission 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 Energy Commission.

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 Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

Exhibit A
Scope of Work

The Recipient shall:

- Prepare 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.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- 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* and 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)
- Task Products (draft and/or final as specified in the task)

CAM Products:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- 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 Energy Commission 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:
  15. Disposition of any state-owned equipment.
  16. Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
  17. The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
  18. Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
  19. "Surviving" Agreement provisions such as repayment provisions and confidential products.
  20. 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 *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary *(if applicable)*
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a monthly Progress Report to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.

- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The

CAM will review the Final Report, which will be due at least two months before the Agreement end date. When creating the Final Report Outline and the Final Report, the Recipient must use the 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 Style Manual provided by the CAM. (See Task 1.1 for requirements for draft and final products.)

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

CAM Product:
- 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, 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)
    - Ensure that the document is written in the third person.
    - Ensure that the Executive Summary is understandable to the lay public.
        - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
        - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
        - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.

- Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.

- 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
- Consider incorporating all CAM comments into the Final Report. 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 Final Report 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.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Products:

- Final Report (draft and final)
- Written Responses to Comments on the Draft 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 Energy Commission funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the Energy Commission 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 Energy Commission awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
  1. 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.
  2. 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.

3. 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 the 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.

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.

Products:

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

Exhibit A
Scope of Work

III. TECHNICAL TASKS

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

TASK 2: DEVELOP PROCESS DESIGN CRITERIA

The goal of this task is to develop process design criteria for the pilot plant.

The Recipient shall:

- Determine the exact composition of geothermal brine at HKG's site and prepare a *Chemical Composition of Geothermal Fluid Report*.
- Develop list of pilot plant deliverables for brine pre-treatment taking into consideration the requirements for the lithium extraction process, financial stakeholders (investors and lenders), engineering scale up parameters, CEC grant requirements and environmental concerns.
- Develop a *Process Design Criteria Report* based on pilot plant deliverables and previous work conducted in the NI 43-101 Preliminary Economic Assessment (PEA)[4].

Products:

- Chemical Composition of Geothermal Fluid Report
- Process Design Criteria Report

TASK 3: DESIGN PILOT PLANT

The goal of this task is to design a pilot plant for pre-treatment of geothermal brine based on its chemical composition.

The Recipient shall:

- Lead the team through the following activities and develop a *Detailed Engineering Report* sufficient for procurement and construction of pilot plant, to include but not be limited to:
    - Create designs for the pretreatment and brine handling equipment.
    - Develop process flow diagram (PFD).
    - Develop mass and energy balance.
    - Develop process and instrumentation diagrams.
    - Complete equipment list and subdivide into "new build" and "purchased" categories.
    - Develop Detailed Engineering Drawings of equipment to be constructed.
    - Develop Detailed Specification Sheets for equipment to be purchased/leased.
- Prepare *CPR Report # 1* and participate in a CPR Meeting per subtask 1.3.

Products:

- Detailed Engineering Report

---

[4] National Instrument 43-101 (the "NI 43-101") is a national instrument for the *Standards of Disclosure for Mineral Projects*. The Instrument is a codified set of rules and guidelines for reporting and displaying information related to mineral properties owned by, or explored by, companies which report these results on stock exchanges within Canada. National Instrument 43-101

- CPR Report # 1

TASK 4: CONSTRUCTION AND PROCUREMENT PLAN
The goal of this task is to develop a construction and procurement plan for the pilot plant.

The Recipient shall:
- Develop a *Construction and Procurement Plan*.
- Develop construction work packages and provide to general contractor.
- Complete equipment procurement agreements (may be purchased or leased, whichever has more favorable cost).
- Draft *CPR Report # 2* and participate in a CPR Meeting per subtask 1.3.

Products:
- Construction and Procurement Plan
- CPR Report # 2

TASK 5: PROCURE AND CONSTRUCT PILOT PLANT
The goal of this task is to procure required equipment and construct a pilot plant.

The Recipient shall:
- Procure required materials and equipment and arrange for delivery to site.
- Construct Pilot Plant.
- Provide *Pilot Plant Commissioning Report* to CAM.
- Draft *CPR Report # 3* and participate in a CPR Meeting per subtask 1.3.
-

Products:
- Pilot Plant Commissioning Report
- CPR Report # 3

TASK 6: OPERATE PILOT PLANT
The goal of this task is to commission and operate the pilot plant.

The Recipient shall:
- Commission pilot plant and create acceptance report ensuring that at each major equipment entrance and exist, brine stream chemistry and characteristics are as per design.
- Operate pilot plant and achieve steady state operation.
- Record and maintain operating data during the course of operations.
- Maintain steady-state operations uninterrupted for at least 600 hours.
- Collect feed brine samples, brine samples between major operations in the pilot plant, final brine composition after removal of impurities and composition of removed solid material.
- Create *Operations Report* including, but not limited to, the following;
    - Raw data
    - Acceptance Report
    - Steady State Operations Report
    - Encountered Technical Challenges and Lessons Learned

1. Prepare *CPR Report # 4* and participate in a CPR Meeting per subtask 1.3.

Products:

- Operations Report
- CPR Report # 4

TASK 7: POST OPERATION ANALYSIS AND EVALUATION

The goal of this task is to analyze and evaluate the pilot plant operation.

The Recipient shall:

- Collate all operating data acquired during operations.
- Evaluate pilot plant performance and at a minimum confirm the following:
    - Reagent consumption rates
    - Mass and energy balance
    - Equipment scale up factors
    - Composition of produced preconditioned brine
    - Composition of removed solid impurities
    - Lessons learned
- Write *Pilot Performance Report,* to include but not be limited to the description of process parameters, such as amount of geothermal brine processed per minute, type of impurities removed, lithium concentration before and after treatment.

Products:

- Pilot Performance Report

TASK 8: TECHNO-ECONOMIC ASSESSMENT

The goal of this task is to develop a techno-economic assessment of a commercial scale facility based on the results of the pilot plant.

The Recipient shall:

- Complete a mass and energy balance analysis of the pilot plant in steady state operations.
- Develop a *Techno-Economic Assessment* of a commercial scale facility based on the results of the pilot plant

Products:

- Techno-Economic Assessment

TASK 9: EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) Kick-off Meeting Benefits Questionnaire; (2) Mid-term Benefits Questionnaire; and (3) Final Meeting Benefits Questionnaire.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:

a. For Product Development Projects and Project Demonstrations:
   - Published documents, including date, title, and periodical name.
   - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
   - Greenhouse gas and criteria emissions reductions.
   - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
   - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
   - A discussion of project product downloads from websites, and publications in technical journals.
   - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.

   - Additional Information for Product Development Projects:
     - Outcome of product development efforts, such copyrights and license agreements.
     - Units sold or projected to be sold in California and outside of California.
     - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
     - Investment dollars/follow-on private funding as a result of Energy Commission funding.
     - Patent numbers and applications, along with dates and brief descriptions.

   - Additional Information for Product Demonstrations:
     - Outcome of demonstrations and status of technology.
     - Number of similar installations.
     - Jobs created/retained as a result of the Agreement.

b. For Information/Tools and Other Research Studies:
   - Outcome of project.
   - Published documents, including date, title, and periodical name.
   - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
   - The number of website downloads.
   - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
   - An estimate of energy and non-energy benefits.
   - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
   - A discussion of project product downloads from websites, and publications in technical journals.
   - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.

- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

TASK 10: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:

- Prepare an Initial Fact Sheet at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a Final Project Fact Sheet at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a Technology/Knowledge Transfer Plan that includes:

1. An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.

2. A description of the intended use(s) for and users of the project results.
3. Published documents, including date, title, and periodical name.
4. Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
5. A discussion of policy development. State if project has been or will be cited in government policy publications or used to inform regulatory bodies.
6. The number of website downloads or public requests for project results.
7. Additional areas as determined by the CAM.

- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop Presentation Materials for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- 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.
- Prepare a Technology/Knowledge Transfer Report on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs

- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

TASK 11: PRODUCTION READINESS PLAN

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

The Recipient shall:

- Prepare a Production Readiness Plan. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
  - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product. Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
  - The estimated cost of production.
  - The expected investment threshold needed to launch the commercial product.
  - An implementation plan to ramp up to full production.
  - The outcome of product development efforts, such as copyrights and license agreements.
  - Patent numbers and applications, along with dates and brief descriptions.
  - Other areas as determined by the CAM.

Products:

- Production Readiness Plan (draft and final)

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 20-0610-12b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: HELL'S KITCHEN GEOTHERMAL LLC.

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, the CEC encumbers $1,460,735, approves Phase I of Agreement EPC-19-018 with Hell's Kitchen Geothermal, LLC, and adopts staff's determination that Phase I is exempt from CEQA. Phase I will design a pilot-scale process for pre-treatment of geothermal brine to prepare the brine for lithium extraction. Activities include the pilot plan design and plan to procure materials and services to construct and operate the facility as well as obtaining approvals from the lead agency to comply with CEQA for Phase II. If approved at a future business meeting at which the lead agency's CEQA actions for Phase II are considered, Phase II involves constructing the facility, commissioning and operating the facility, and collecting data on project activities. The grant recipient is not authorized to expend funds or perform work on Phase II until and if the CEC approves it at a future business meeting; and

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

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on June 10, 2020.

AYE:
NAY:
ABSENT:
ABSTAIN:

_____
Cody Goldthrite
Secretariat