STATE OF CALIFORNIA
GRANT REQUEST FORM (GRF)
CEC-270 (Revised 12/2019) CALIFORNIA ENERGY COMMISSION

A) New Agreement # PIR-21-001 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Peter Chen	43	916-776-0743

C) Recipient's Legal Name	Federal ID Number
Cummins Electrified Power NA Inc.	20-5546260

D) Title of Project
Hydrogen Fuel Cell Truck (HyFCT) Technology Integration and Demonstration

E) Term and Amount

Start Date	End Date	Amount
4/1/2022	6/30/2025	$ 2,000,000

F) Business Meeting Information

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

Proposed Business Meeting Date 3/9/2022 ☐ Consent ☒ Discussion

Business Meeting Presenter Peter Chen Time Needed: 5 minutes

Please select one list serve. NaturalGas (NG Research Program

Agenda Item Subject and Description:
CUMMINS ELECTRIFIED POWER NA Inc. Proposed resolution approving Agreement PIR-21-001 with Cummins Electrified Power NA Inc. for a $2,000,000 grant to develop and demonstrate two zero-emission hydrogen fuel cell-electric trucks capable of meeting a challenging industrial bulk gas delivery duty cycle, and adopting staff's determination that this action is exempt from CEQA. The project will integrate an advanced fuel cell electric powertrain, demonstrate one-to-one replacement of conventional Class 8 diesel trucks, develop a truck-mounted electrified power take-off to power a pump for cryogenic cargo tank trailers, and assess the feasibility of on-board liquid hydrogen storage for extended range. (Gas R&D Program Funding) Contact: Peter Chen.

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; Cal. Code Regs., tit. 14 § 15301
      ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
      Explain reason why Agreement is exempt under the above section:

This project is exempt under Cal. Code Regs., tit. 14, section 15306 because it primarily focuses on information collection efforts related to the design and use of two hydrogen fuel cell trucks. Two trucks will be assembled and driven for demonstration purposes. Periodically throughout the demonstration, operational data on performance and energy usage will be collected from the trucks; this is the primary purpose of this project. Data analysis will be done within existing laboratory and industrial environments. For these reasons, this project will have no significant effect on the environment and fits within section 15306.

This project is also exempt under Cal. Code Regs., tit. 14, Section 15301 because work will be conducted at existing facilities. Specifically, two truck chassis will be purchased and modified at an existing industrial facility in West Sacramento. The modified trucks will be primarily operated out of an existing industrial terminal in Santa Fe Springs, and will make deliveries throughout the Greater Los Angeles region. The modified trucks will be periodically driven to an existing research facility in Riverside where operational data will be collected. For these reasons, this project will have no significant effect on the environment and fits within section 15301.

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**
Zen and the Art of Clean Energy Solutions, Inc.	$ 35,000
Breathe Southern California	$ 50,000
The Regents of the University of California - Riverside	$ 95,000
	$

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

Legal Company Name:
Air Products and Chemicals, Inc.

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
NG Subaccount, PIERDD	20-21	501.001O	$2,000,000

R&D Program Area: EGRO: Transportation TOTAL: $ 2,000,000

Explanation for “Other” selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Jean-Baptiste Gallo

Address: 3300 Industrial Blvd Ste 700 Suite 700

City, State, Zip: West Sacramento, CA 95691-5035

Phone: 669-235-1647

E-Mail: jeanbaptiste.gallo@cummins.com

2. Recipient's Project Manager

Name: Jean-Baptiste Gallo

Address: 3300 Industrial Blvd Ste 700 Suite 700

City, State, Zip: West Sacramento, CA 95691-5035

Phone: 669-235-1647

E-Mail: jeanbaptiste.gallo@cummins.com

L) Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-21-501

☐ First Come First Served Solicitation Solicitation #:

☐ Non-Competitive Bid Follow-on Funding (SB 115)

M) The following items should be attached to this GRF

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

Agreement Manager **Date**

Office Manager **Date**

Deputy Director **Date**

Exhibit A
Scope of Work
Cummins Electrified Power NA Inc.

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2	X	Vehicle Design
3	X	Vehicle Build, Test, and Commissioning
4		Demonstration, Data Collection, and Data Analysis
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
BOM	Bill of Materials
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CE-CERT	College of Engineering/Center for Environmental Research and Technology
CPR	Critical Project Review
DVP&R	Design Verification Plan & Report
ePTO	Electrified Power Take-Off
EER	Energy Economy Ratio
HyFCT	Hydrogen Fuel Cell Truck
ICE	Internal Combustion Engine
LH_2	Liquid Hydrogen
NFPA	National Fire Protection Association
SCAQMD	South Coast Air Quality Management District
TAC	Technical Advisory Committee
UCR	University of California at Riverside
US DOE	United States Department of Energy

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 two advanced, production-intent, zero-emission hydrogen fuel cell trucks (HyFCT) capable of meeting challenging duty cycle requirements and achieving broader market adoption.

[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

Heavy-duty vehicles and particularly Class 8 truck tractors need to be electrified to meet California's ambitious air quality and climate goals. Hydrogen fuel cell technology can provide zero-emissions, operational flexibility, one-to-one replacement of conventional trucks, and cost-effective refueling infrastructure at scale. Hydrogen fuel cell and battery electric trucks are complementary technology options for truck manufacturers and fleets to meet the California Air Resources Board's Advanced Clean Trucks and Advanced Clean Fleets regulations and Executive Order N-79-20. No commercially available hydrogen fuel cell trucks exist today, and very limited data is available to inform end users of the real-world operational characteristics of hydrogen fuel cell trucks. With the California Air Resources Board Advanced Clean Trucks regulation beginning as early as 2024, the development of production-intent hydrogen fuel cell trucks needs to be accelerated.

Solution

The Recipient will demonstrate two advanced, zero-emission hydrogen fuel cell-electric trucks capable of meeting challenging duty cycle requirements that only diesel-powered trucks can meet today. The proposed hydrogen fuel cell trucks (HyFCT) will incorporate learnings from initial pre-production prototype demonstrations and component-level advancements that will improve the performance, efficiency, durability, maintainability and operating costs of hydrogen fuel cell trucks and result in broader market adoption by 2025. In particular, the Recipient proposes an advanced fuel cell electric powertrain equipped with a next generation integrated fuel cell solution and a modular system architecture that is easy to package and integrate.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Deliver two (2) Class 8 zero-emission hydrogen fuel cell trucks, capable of meeting the demonstration fleet partner's challenging duty cycle requirements such as long routes, limited refueling opportunities, high payload weight capacity needs, and power take-off option.
- Demonstrate the Class 8 zero-emission hydrogen fuel cell trucks with the demonstration fleet partner in SoCalGas service territory.
- Measure and verify the Class 8 zero-emission hydrogen fuel cell trucks performance to validate design improvements and calculate a projected total cost of ownership.
- Inform other end-users of the real-world operational characteristics of hydrogen fuel cell trucks and identify opportunities for commercialization and continued technology advancement.

Ratepayer Benefits: This Agreement will result in the ratepayer benefits of accelerating commercialization of Class 8 zero-emission hydrogen fuel cell trucks, which will increase the demand for low-carbon hydrogen in the transportation sector and reduce greenhouse gas and air pollutant emissions. The demonstration vehicles will displace an estimated 24,300 gallons of diesel with 16 tons of hydrogen demand, 300 tons of carbon dioxide equivalent emissions, and 83 kg of oxides of nitrogen emissions over 12 months. These emission reductions will lead to environmental and public health benefits. Driving the production of more green electrolytic hydrogen at scale through the commercialization of hydrogen fuel cell trucks will help enable

decarbonization of other challenging end-uses that rely heavily on fossil fuels. This increased demand will help hydrogen play a role in decarbonizing the natural gas sector and mitigate the risk for the vast California natural gas infrastructure to become a stranded asset as the state transitions away from fossil fuels.

Technological Advancement and Breakthroughs: This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by developing an advanced fuel cell electric powertrain equipped with a next generation integrated fuel cell solution that is more durable, lower cost and uses a more efficient air management system than current fuel cell technology. In addition, this Agreement will demonstrate a modular system architecture that is easy to package and integrate for truck original equipment manufacturers, accelerating progress towards the introduction to market of commercially-competitive, heavy-duty hydrogen fuel cell trucks.

Agreement Objectives

The objectives of this Agreement are to:

- Integrate an advanced fuel cell electric powertrain into a base truck platform that is available today in large volumes and is suitable for the specific application.
- Demonstrate one-to-one replacement of a conventional diesel-powered Class 8 heavy-duty truck in representative real-world operation.
- Develop a truck-mounted electrified power take-off (ePTO) option to power a product offload pump on cryogenic cargo tank trailers.
- Assess the technical feasibility of how the HyFCT's hydrogen storage system can be transitioned to liquid hydrogen (LH_2).
- Advance the technology readiness level of the fuel cell electric powertrain from TRL 4-5 to TRL 7-8.
- Demonstrate a path to achieve 25,000 hours or 10 years / 1,000,000 miles fuel cell system lifetime.
- Achieve an Energy Economy Ratio (EER) for hydrogen fuel cell truck relative to equivalent diesel-powered vehicle of at least 1.9.
- Achieve a total cost of ownership reduction compared to current fuel cell vehicle technology of at least 30 percent.

Exhibit A
Scope of Work
Cummins Electrified Power NA Inc.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V).** All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations**.** All technical tasks should include product(s). Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

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

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

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

For all products

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

    - **Electronic File Format**
        - Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission's (CEC) software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick.

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

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

- **Software Application Development**

  Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
  - Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
  - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
  - Visual Studio.NET (version 2008 and up). Recommend 2010.
  - C# Programming Language with Presentation (UI), Business Object and Data Layers.
  - SQL (Structured Query Language).
  - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
  - Microsoft SQL Reporting Services. Recommend 2008 R2.
  - XML (external interfaces).

  Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the CEC's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - 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
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with CEC staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any procured equipment.

  - The CEC's request for specific "generated" data (not already provided in Agreement products).
  - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
  - "Surviving" Agreement provisions such as repayment provisions and confidential products.
  - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

The Recipient shall:
- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Funds and in-state expenditures.

Products:
- Progress Reports
- Invoices

Subtask 1.6 Final Report

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

creating the Final Report Outline and the Final Report, the Recipient must use the Energy Commission Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

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

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

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

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)
    - Acknowledgements page (optional)
    - Preface (**required**)
    - Abstract, keywords, and citation page (**required**)
    - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
    - Executive summary (**required**)
    - Body of the report (**required**)
    - References (if applicable)
    - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
    - Bibliography (if applicable)
    - Appendices (if applicable) (Create a separate volume if very large.)
    - Attachments (if applicable)
- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
  - Comments the recipient proposes to incorporate.
  - Comments the recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the Final Report. If the Recipient disagrees with any

comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised Final Report electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:
- Summary of TAC Comments
- Draft Final Report
- Written Responses to Comments *(if applicable)*
- Final Report

CAM Product:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of CEC funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:
- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

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

- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

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

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

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

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

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

Subtask 1.9 Subcontracts
The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

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

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)
The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

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

- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

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

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

The Recipient shall:

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

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC

meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

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

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

Subtask 1.12 Project Performance Metrics
The goal of this subtask is to identify key performance targets for the project. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:
- Complete and submit the draft *Project Performance Metrics Questionnaire* to the CAM prior to the Kick-off Meeting.
- Present the draft *Project Performance Metrics Questionnaire* 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 final *Project Performance Metrics Questionnaire*.
  - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit a final *Project Performance Metrics Questionnaire* with incorporated TAC feedback.
- 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*

Performance Metrics Questionnaire.

- Discuss the final *Project Performance Metrics Questionnaire* and *Project Performance Metrics Results* at the Final Meeting.

Products:

- Project Performance Metrics Questionnaire (draft and final)
- TAC Performance Metrics Summary
- Project Performance Metrics Results

Exhibit A
Scope of Work
Cummins Electrified Power NA Inc.

IV. TECHNICAL TASKS

TASK 2: VEHICLE DESIGN

The goals of this task are to define the vehicle system and subsystem requirements to ensure compliance with the goals and objectives of the Agreement, incorporate lessons learned from the Zero Emission Cargo Transport (ZECT) II fuel cell truck prototype as the predecessor to the zero-emission HyFCT, finalize the vehicle design for the HyFCT, and perform a technical feasibility assessment of how the HyFCT's hydrogen storage system can be transitioned to LH_2. ZECT II is the initial pre-production prototype demonstration project funded by the United States Department of Energy (US DOE) and South Coast Air Quality Management District (SCAQMD) (DOE DE-EE0006874).

Subtask 2.1 Vehicle Design

The goal of this subtask is to finalize the vehicle design by incorporating learnings from the ZECT II prototype and other relevant projects and making design changes necessary for the HyFCT's several engineering and component-level advancements as well as innovative integration strategies.

The Recipient shall:

- Prepare a *DOE/SCAQMD Fuel Cell Truck Prototype Build and Validation Report* that will serve as the lessons learned from the ZECT II prototype to be incorporated into the HyFCT final design.
- Optimize the individual major subsystems relative to prioritized criteria identified in the DOE/SCAQMD Fuel Cell Truck Prototype Build and Validation Report.
- Perform design studies for overall system architecture with new major components and subsystems.
- Make design changes to adapt the existing fuel cell electric powertrain to the Recipient's advanced fuel cell module, high power battery pack and other key component upgrades. This includes, but is not limited to:
    - Design new fuel cell air intake and exhaust system,
    - Design new fuel cell thermal management system,
    - Design new power electronics thermal management system,
    - Design new high voltage battery system,
    - Design new high voltage battery thermal management system,
    - Design new hydrogen storage system,
    - Design new high voltage system,
    - Design new high/low voltage wire harness system,
    - Design new thermal management system plumbing,
    - Design new fabricated parts and brackets,
    - Develop new control system.
- Design the truck-mounted ePTO.
- Design initial packaging and layout of the vehicle system and subsystem and review to optimize design for manufacturability, reliability, and serviceability.
- Ensure that the vehicle design complies with applicable laws, ordinances, regulations, and standards related to safety, such as through analyses of the following as applicable to the vehicle design:
    - Failure mode and effects analysis,

  - Hazard and operability analysis,
  - Compliance with Federal Motor Vehicle Safety Standards,
  - Adherence to the most recent public guidelines, such as those published by the Pacific Northwest National Laboratory Hydrogen Safety Panel for safety planning for hydrogen and fuel cell projects,
  - Conformance with relevant National Fire Protection Association (NFPA) 2 codes.
- Perform design iterations to optimize and refine design.
- Finalize the detailed designs and specification for each component, subsystem, and the overall vehicle.
- Conduct design reviews, finalize Bill of Materials (BOM) and release system drawings.
- Prepare the *Vehicle Design Report (draft and final)* that includes but is not limited to:
  - Summary of key vehicle design aspects including the HyFCT's engineering and component-level advancements and innovative integration strategies.
  - Summary of the vehicle design's compliance with applicable laws, ordinances, regulations, and standards related to safety, and safety analyses conducted as applicable to the vehicle design.
  - Description of the truck-mounted ePTO design.
- Prepare a *CPR Report #1* in accordance with Subtask 1.3.
- Participate in CPR Meeting #1

Products:
- DOE/SCAQMD Fuel Cell Truck Prototype Build and Validation Report
- Vehicle Design Report (draft and final)
- CPR Report #1

Subtask 2.2 Liquid Hydrogen Technical Feasibility Assessment
The goal of this subtask is to perform a technical feasibility assessment of how the HyFCT's hydrogen storage system can be transitioned to LH_2.

The Recipient shall:
- Conduct a technical feasibility assessment of how the hydrogen storage system can use LH_2. This includes, but is not limited to:
  - LH_2 tank and system supply chain analysis;
  - Assessment of technical performance of current LH_2 systems;
  - LH_2 fueling infrastructure supply chain analysis;
  - Assessment of technical performance of current LH_2 fueling infrastructure;
  - Overall LH_2 storage system requirements;
  - Operational requirements;
  - Space requirements;
  - Overall LH_2 storage system costs;
  - Overall LH_2 fueling costs.
- Prepare a *Liquid Hydrogen Feasibility Report (draft and final)* that summarizes the outcomes of the technical feasibility assessment.

Products:
- Liquid Hydrogen Feasibility Report (draft and final)

Exhibit A
Scope of Work
Cummins Electrified Power NA Inc.

TASK 3: VEHICLE BUILD, TEST, AND COMMISSIONING
The goals of this task are to build, test, and commission the zero-emission hydrogen fuel cell trucks (HyFCT).

Subtask 3.1 Vehicle #1 Build
The goal of this subtask is to build the HyFCT #1.

The Recipient shall:
- Place orders for parts and equipment based on BOM.
- Prepare base vehicle chassis for system upfit.
- Build low and high voltage wiring harnesses and thermal management cooling lines.
- Build and assemble the powertrain subsystems (such as fuel cell, fuel storage and delivery, accessory, traction, high voltage battery, cooling).
- Test all subsystems and assemblies.
- Integrate all subsystems into the truck chassis and finalize the truck build.
- Provide *High quality digital photographs of the completed vehicle #1*.

Products:
- High quality digital photographs of the completed vehicle #1

Subtask 3.2 Vehicle #2 Build
The goal of this subtask is to build the HyFCT #2.

The Recipient shall:
- Place orders for parts and equipment based on BOM.
- Prepare base vehicle chassis for system upfit.
- Build low and high voltage wiring harnesses and thermal management cooling lines.
- Build and assemble the powertrain subsystems (such as fuel cell, fuel storage and delivery, accessory, traction, high voltage battery, cooling).
- Test all subsystems and assemblies.
- Integrate all subsystems into the truck chassis and finalize the truck build.
- Provide *High quality digital photographs of the completed vehicle #2*.

Products:
- High quality digital photographs of the completed vehicle #2

Subtask 3.3 Vehicle Testing and Commissioning
The goals of this subtask are to test and commission the HyFCTs.

The Recipient shall:
- Perform commissioning, functional verification, and shakedown testing to verify that all systems operate as expected and meet performance requirements. Address issues identified during the system shakedown and perform additional vehicle tuning as needed.
- Perform end-of-line testing to validate the performance and reliability of the prototype vehicles through formal Design Verification Plan & Report (DVP&R) process. This includes checking the vehicles while stationary and moving under controlled conditions and performing at least 2,500 miles of on-road testing. Address issues identified during the end-of-line testing and perform additional vehicle tuning as needed.

- Conduct electrical and structural tests, to ensure the system is robust and durable. Address issues identified during the electrical and structural testing and perform additional vehicle tuning as needed.
- Install approved telematics data collection devices on the vehicles.
- Prepare and submit the *HyFCT Commissioning Report* that includes but is not limited to:
    - Summary of commissioning, functional verification, and shakedown testing results.
    - Summary of end-of-line testing results.
    - Summary of electrical and structural test results.
- Prepare a *CPR Report #2* in accordance with Subtask 1.3.
- Participate in CPR Meeting #2

Products:

- HyFCT Commissioning Report (draft and final)
- CPR Report #2

Subtask 3.4 Chassis Dynamometer Testing

The goals of this subtask are to test one of the HyFCT at the Heavy-Duty Chassis Dynamometer laboratory of the University of California at Riverside (UCR) College of Engineering/Center for Environmental Research and Technology (CE-CERT) and compare the results with previous chassis dynamometer testing performed at CE-CERT on an initial pre-production hydrogen fuel cell truck prototype.

The Recipient shall:

- Develop a HyFCT Chassis Dynamometer Test Plan that includes but is not limited to:
    - Description of chassis dynamometer test procedure,
    - Description of drive cycles that will be used to the test the HyFCT,
    - Comparison with chassis dynamometer test plan used for the initial pre-production hydrogen fuel cell truck prototype.
- Perform chassis dynamometer testing at CE-CERT's Heavy-Duty Chassis Dynamometer laboratory.
- Address issues identified during the chassis dynamometer testing and perform additional vehicle tuning as needed.
- Prepare and submit the *HyFCT Chassis Dynamometer Testing Report* that includes but is not limited to:
    - Summary of chassis dynamometer test results,
    - Comparison with chassis dynamometer test results for the initial pre-production hydrogen fuel cell prototype.

Products:

- HyFCT Chassis Dynamometer Test Plan (draft and final)
- HyFCT Chassis Dynamometer Testing Report (draft and final)

TASK 4: DEMONSTRATION, DATA COLLECTION, AND ANALYSIS

The goals of this task are to demonstrate the HyFCTs with the demonstration fleet partner in representative real-world operation, as well as collect and analyze real-world demonstration data.

Subtask 4.1 Demonstration Plan

The goal of this subtask is to develop a Demonstration Plan that encompasses fueling, operations, and maintenance to ensure the success of the 12-month demonstration with the demonstration fleet partner.

The Recipient shall:

- Ensure hydrogen fuel is available at the demonstration site for a minimum of 12 months.
- Prepare and submit the *Demonstration Plan* that includes:
    - The Fueling Plan defining the hydrogen fueling requirements, schedule, and other details specific to the hydrogen storage design.
    - The Operations Plan documenting all necessary procedures for the demonstration of the HyFCTs, including but not limited to:
        - Test site and schedule;
        - Vehicle transportation to/from test site;
        - Vehicle and test site set up procedures; and
        - Relevant safety considerations.
    - The Maintenance Plan documenting the preventative maintenance schedule and process flow for responding to issues encountered during the demonstration.

Products:

- Demonstration Plan (draft and final)

Subtask 4.2 Measurement and Verification (M&V) Plan

The goal of this subtask is to develop the M&V Plan to describe how key operating data will be collected and reported over the course of the demonstration.

The Recipient shall:

- Develop the *M&V Plan* which will include:
    - Definition of performance parameters to be collected, including, but not limited to:
        - Vehicle and powertrain specifications including manufacturer, gross vehicle weight, fuel capacity, battery capacity, and rated power.
        - Vehicle operation including duty cycle, descriptions of daily usage, average speed, payload weight, trip duration, and trip distance.
        - Vehicle performance including maintenance information, vehicle availability, vehicle range, fuel cell degradation, and battery degradation.
        - Fuel consumption including fuel price, refueling time, distance traveled to refuel, refueling source, refueling frequency, and energy efficiency.
        - Fleet experience including qualitative comparisons with other vehicle technologies, remaining gaps or barriers to adoption, and operator feedback.
    - Identification of the method of collection for each performance parameter.
    - Definition of the frequency of collection and method of reporting.

Products:

- M&V Plan (draft and final)

Subtask 4.3 Vehicle Demonstration and Data Collection

The goals of this subtask are to test the HyFCTs with the demonstration fleet partner and collect real-world demonstration data for a period of 12 months.

The Recipient shall:

- Train local service technicians where the HyFCTs will be demonstrated to service and repair the trucks during the demonstration phase.
- Prepare the HyFCTs for real-world operation and transport to the demonstration fleet partner.
- Train vehicle operators on vehicle operation, efficient driving and H_2 refueling.
- Train fleet managers and service and maintenance technicians on vehicle inspection, service, and maintenance procedures, as well as troubleshooting.
- Operate the HyFCTs in representative real-world operation for a minimum of 12 months.
- Provide maintenance and service to the HyFCTs, as required.
- Collect key operating data during the field demonstration period following the M&V Plan.
- Prepare and submit *Monthly Performance Reports*, which will include at a minimum:
    - Daily miles driven,
    - Maximum speed,
    - Average speed,
    - Fuel consumption,
    - Fuel cell operating hours.

Products:

- Monthly Performance Reports

Subtask 4.4 Data Analysis

The goal of this subtask is to analyze the real-world demonstration data collected in Subtask 4.3

The Recipient shall:

- Prepare the *Data Analysis Report* that will:
    - Aggregate the data from the Monthly Performance Reports.
    - Validate HyFCT's ability to meet Air Product's challenging duty cycle requirements.
    - Validate design improvements and calculate a projected total cost of ownership with a detailed breakdown of capital, operating, and maintenance costs associated with HyFCT.
    - Compare the final vehicle cost and performance metrics with equivalent internal combustion engine and battery-electric vehicles.
    - Compare final vehicle metrics with the current state of hydrogen fuel cell vehicle technology to document improvements.

Products:

- Data Analysis Report (draft and final)

TASK 5 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete *the Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.

- Complete the *Annual Survey* by December 15th 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 6 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to conduct activities that will accelerate the commercial adoption of the technology being supported under this agreement. Eligible activities include, but are not limited to, the following:

- Scale-up analysis including manufacturing analysis, independent design verification, and process improvement efforts.
- Technology verification testing, or application to a test bed program located in California.
- Legal services or licensing to secure necessary intellectual property to further develop the technology
- Market research, business plan development, and cost-performance modeling.
- Entry into an incubator or accelerator program located in California.

The Recipient Shall:

- Develop and submit a *Technology Transfer Plan (Draft/Final)* that identifies the proposed activities the recipient will conduct to accelerate the successful commercial adoption of the technology.
- Present the *Draft Technology Transfer Plan* to the TAC for feedback and comments.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the *Draft Technology Transfer Plan*. This document will identify:
    - TAC comments the recipient proposes to incorporate into the *Final Technology Transfer Plan*.

  - TAC comments the recipient does not propose to incorporate with an explanation why.
- Submit the *Final Technology Transfer Plan* to the CAM for approval.
- Implement activities identified in *Final Technology Transfer Plan.*
- Develop and submit a *Technology Transfer Summary Report (Draft/Final)* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the *Final Technology Transfer Plan*. This report should not include any proprietary information.
- When directed by the CAM, develop presentation materials for an CEC-sponsored conference/workshop(s) on the project.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 22-0309-13a

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: CUMMINS ELECTRIFIED POWER NA INC.

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

RESOLVED, that the CEC approves Agreement PIR-21-001 with Cummins Electrified Power NA Inc. for a $2,000,000 grant to develop and demonstrate two zero-emission hydrogen fuel cell-electric trucks capable of meeting a challenging industrial bulk gas delivery duty cycle. The project will integrate an advanced fuel cell electric powertrain, demonstrate one-to-one replacement of conventional Class 8 diesel trucks, develop a truck-mounted electrified power take-off to power a pump for cryogenic cargo tank trailers, and assess the feasibility of on-board liquid hydrogen storage for extended range; 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 March 9, 2022.
AYE:
NAY:
ABSENT:
ABSTAIN:

_____
Liza Lopez
Secretariat