



STATE OF CALIFORNIA

GRANT AMENDMENT REQUEST FORM (GARF)

CEC-277 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

Original Agreement # ARV-18-018 Amendment # 1

Division	Agreement Manager:	MS-	Phone
600 Fuels and Transportation Division	Micah Wofford	6	916-653-8685

Recipient's Legal Name	Federal ID #
Oberon Fuels, Inc.	27-3934627

Revisions: (check all that apply)	Additional Requirements
<input checked="" type="checkbox"/> Term Extension New End Date: 9 / 30 / 2021	Include revised schedule and complete items A, B, C, & F below.
<input type="checkbox"/> Budget Augmentation Amendment Amount: \$ 0	Include revised budget and complete items A, B, C, D, & F below.
<input checked="" type="checkbox"/> Budget Reallocation	Include revised budget and complete items A, B, C, & F below.
<input checked="" type="checkbox"/> Scope of Work Revision	Include revised scope of work and complete items A, B, C, E, & F below.
<input type="checkbox"/> Change in Project Location or Demonstration Site	Include revised scope of work and complete items A, B, C, E, & F below.
<input type="checkbox"/> Novation/Name Change of Prime Recipient	Include novation documentation and complete items A, B, C, & F below.
<input type="checkbox"/> Terms and Conditions Modification	Include applicable exhibits with bold/underline/ strikeout and complete items A, B, C, & F below.

A) Business Meeting Information

Business Meeting approval is not required for the following types of Agreements:

Minor amendments delegated to Executive Director per December 2013 Resolution

Proposed Business Meeting Date 8 / 12 / 2020 Consent Discussion

Business Meeting Presenter Micah Wofford Time Needed: 5 minutes

Please select one list serve. Altfuels (AB118- ARFVTP)

Agenda Item Subject and Description:

Proposed resolution approving Amendment #1 to Grant ARV-18-018 with Oberon Fuels, Inc. to shift from developing diesel-to-dimethyl ether (DME) engine conversion kits for trucks to validating the feasibility of utilizing a DME propane blend as a drop-in fuel for light- and medium-duty vehicles, and adopting staff's determination that this action does not change the CEC's original CEQA findings. Project activities to increase DME production from the existing plant remain unchanged.

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



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Legal Company Name:	Budget
See attached list	\$ 0.00
	\$ 0.00
	\$ 0.00

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

Legal Company Name:
See attached list

D) Budget Information (only include amendment amount information)

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
Funding Source			\$

R&D Program Area: Select Program Area TOTAL: \$

Explanation for "Other" selection

Federal Agreement #:

E) 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":

Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .

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:
 - Common Sense Exemption. 14 CCR 15061 (b) (3) Explain reason why Agreement is exempt under the above section:
- 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



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Statement of Overriding Considerations

The Energy Commission (CEC) made CEQA findings when it approved this agreement at its June 12, 2019 business meeting. The CEC is a responsible agency under CEQA and previously reviewed the lead agency’s CEQA documentation, which included an initial study and mitigated negative declaration. The current amendment does not change the previously approved project activities of increasing the dimethyl ether (DME) production at its plant. Instead, this amendment only changes the exploration of applications for the produced DME. Instead of developing DME engine conversion kits for trucks, the project will research the feasibility of utilizing a DME propane blend as a drop-in fuel for light- and medium-duty vehicles. The changes proposed in this amendment will not result in any impact to the environment beyond those the CEC already considered when it approved the agreement and do not require changing the CEQA documents prepared for the original agreement.

F) The following items should be attached to this GARF (as applicable)

- | | | |
|---|---|--|
| 1. Exhibit A, Scope of Work | <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Attached |
| 2. Exhibit B, Budget Detail | <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Attached |
| 3. CEQA Documentation | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |
| 4. Novation Documentation | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |
| 5. CEC 105, Questionnaire for Identifying Conflicts | | <input checked="" type="checkbox"/> Attached |

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

List all subcontractors (major and minor) and equipment vendors

Legal Company Name:	Budget - CEC share	Match share
PMCCA, Inc.	\$ 466,810	\$ -
Dynalectric Company	\$ 173,513	\$ -
Roddey Engineering Services, Inc.	\$ 279,040	\$ -
CALSTART, Inc.	\$ 150,000	\$ -
Parafour Innovations, LLC	\$ -	\$ 20,000
North American Institute of Technology	\$ -	\$ -
Philip Dingle Consulting, LLC	\$ -	\$ 20,000
ROUSH CleanTech	\$ -	\$ 17,500
SHV Energy	\$ -	\$ 320,000
Propane Education and Research Council	\$ -	\$ 50,000

Exhibit A SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1		Administration
2	X	Scale Up DME Plant from Pilot to Demonstration
3		Test DME Production Using Renewable Methanol Feedstock
4	X	DME Fuel Stations Installation, Operation and Training
5	X	<u>Develop DME Fuel System Conversion Plan</u>
6	<u>X</u>	DME <u>Propane Blend Testing and Deployment</u>
7		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Oberon Fuels, Inc.		
2	Oberon Fuels, Inc.		
3	Oberon Fuels, Inc.		Alberta Pacific Forest Industries, Inc.
4	Oberon Fuels, Inc.		
5	Oberon Fuels, Inc.		
6	<u>Oberon Fuels, Inc.</u>		<u>ROUSH Cleantech</u>

GLOSSARY

Specific terms and acronyms used throughout this scope of work are defined as follows:

Term/ Acronym	Definition
ARFVTP	Alternative and Renewable Fuel and Vehicle Technology Program
BOM	Bill of Materials
CAM	Commission Agreement Manager
CPR	Critical Project Review
DME	Dimethyl Ether
FTD	Fuels and Transportation Division
HAZOP	Hazard and Operability Study
rDME	Renewable Dimethyl Ether
Recipient	Oberon Fuels, Inc.

Background

Assembly Bill (AB) 118 (Núñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The statute authorizes the California Energy Commission (Energy Commission) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change, clean air, and alternative energy policies. AB 8 (Perea, Chapter 401, Statutes of 2013)

re-authorizes the ARFVTP through January 1, 2024. The ARFVTP has an annual budget of approximately \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

The Energy Commission issued solicitation GFO-18-602 for demonstration-scale advanced biofuels production facilities. To be eligible for funding under solicitation GFO-18-602 (the "Solicitation"), projects must also be consistent with the Energy Commission's ARFVTP Investment Plan, updated annually. In response to GFO-18-602, Oberon Fuels, Inc. (Recipient) submitted application 5, which was proposed for funding in the Energy Commission's Notice of Proposed Awards on January 18, 2019. The Solicitation documents and Recipient's aforementioned applications are hereby incorporated by reference into this Agreement in their entirety.

In the event of any conflict or inconsistency between the terms of the Solicitation and the terms of the Recipient's Application, the Solicitation shall control. In the event of any conflict or inconsistency between the Recipient's Application and the terms of the Energy Commission's Award, the Energy Commission's Award shall control. Similarly, in the event of any conflict or inconsistency between the terms of this Agreement and the Recipient's Application, the terms of this Agreement shall control.

Problem Statement:

Oberon's methanol-to-dimethyl ether (DME) pilot plant was completed in 2013 and provided DME fuel for market development projects as well as valuable operational data. Utilizing a catalytic distillation column, the methanol-to-DME plant was the first of its kind. Based on the pilot operation, the project team identified modifications that would significantly increase the throughput rate of the process.

Funds from this grant application will be used to implement the process modifications, resulting in improved economics for small-scale DME production from a variety of feedstocks, including renewable methanol from pulp and paper mills, and biogas from dairy manure. This will enable to roll-out of multiple plants based on this design, producing renewable DME (rDME) to displace diesel and supply the hydrogen transportation fuel market.

Goals of the Agreement:

The goals of this Agreement are to:

1. Demonstrate the technical, economic, and market viability of rDME as a California-produced, low-carbon, diesel replacement and a pathway for renewable hydrogen, by building and testing a DME supply chain: fuel production, distribution, fueling infrastructure, and fleet utilization.
2. Scale-up the Oberon Fuels pilot DME production plant to operate at a capacity and an efficiency level suitable for ongoing commercial operation.
3. **Assess or demonstrate** the cost-effectiveness, performance, and ease of operation of DME **and DME propane** blend vehicles and fueling infrastructure.

Objectives of the Agreement:

The objectives of this Agreement are to:

1. Increase the stable production capacity of the Oberon process by 100% (from about 2,250 gallons/day to 4,500 gallons/day).
2. Determine the technical feasibility of converting renewable methanol from the Kraft pulping process to DME.
3. Calculate the capital and operating costs of converting this renewable methanol stream to rDME via the Oberon catalytic distillation process.
4. Build **a** DME fueling station in the Imperial Valley region to support **future** DME vehicle trials.
5. **Develop a plan for the conversion of 5** diesel-powered trucks to run on 100% DME.
6. **Work with industry partners to test DME propane blend as a drop-in fuel for propane vehicle applications.**
7. Evaluate capital and operating costs **of operating on DME propane blend fuel.**
8. Evaluate the performance of these vehicles based on qualitative and quantitative performance variables (power, fuel efficiency, emissions), fueling logistics, maintenance requirements, and driver feedback.

TASK 1 ADMINISTRATION

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement. The CAM shall designate the date and location of this meeting and provide an agenda to the Recipient prior to the meeting.

The Recipient shall:

- Attend a “Kick-Off” meeting with the Commission Agreement Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator, Accounting Officer, and others designated by the Commission Agreement Manager to this meeting.
- Discuss the following administrative and technical aspects of this Agreement:
 - Agreement Terms and Conditions
 - Critical Project Review (Task 1.2)
 - Match fund documentation (Task 1.6) No reimbursable work may be done until this documentation is in place.
 - Permit documentation (Task 1.7)
 - Subcontracts needed to carry out project (Task 1.8)
 - The CAM’s expectations for accomplishing tasks described in the Scope of Work
 - An updated Schedule of Products and Due Dates
 - Monthly Progress Reports (Task 1.4)

- Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Final Report (Task 1.5)

Recipient Products:

- Updated Schedule of Products
- Updated List of Match Funds
- Updated List of Permits

Commission Agreement Manager Product:

- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

The Commission Agreement Manager may schedule CPR meetings as necessary, and meeting costs will be borne by the Recipient.

Meeting participants include the CAM and the Recipient and may include the Commission Grants Officer, the Fuels and Transportation Division (FTD) biofuel lead, other Energy Commission staff and Management as well as other individuals selected by the CAM to provide support to the Energy Commission.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. Prepare a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see section 8 of the Terms and Conditions). If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Lead Commissioner for Transportation for his or her concurrence.
- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR. **The Recipient shall:**

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other products identified in this scope of work. The Recipient shall submit these documents to the CAM and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

CAM Products:

- Agenda and a list of expected participants
- Schedule for written determination
- Written determination

Recipient Product:

- CPR Report(s)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.
This meeting will be attended by, at a minimum, the Recipient, the Commission Grants Office Officer, and the Commission Agreement Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Agreement Manager.
The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Commission Agreement Manager will determine the appropriate meeting participants.
The administrative portion of the meeting shall be a discussion with the Commission Agreement Manager and the Grants Officer about the following Agreement closeout items:
 - What to do with any equipment purchased with Energy Commission funds (Options)
 - Energy Commission's request for specific "generated" data (not already provided in Agreement products)
 - Need to document Recipient's disclosure of "subject inventions" developed under the Agreement
 - "Surviving" Agreement provisions
 - Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

Products:

- Written documentation of meeting agreements

- Schedule for completing closeout activities

Task 1.4 Monthly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.

The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

The Recipient shall:

- Prepare a Monthly Progress Report which summarizes all Agreement activities conducted by the Recipient for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Agreement Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Section 6 of the Terms and Conditions of this Agreement.
- In the first Monthly Progress Report and first invoice, document and verify match expenditures and provide a synopsis of project progress, if match funds have been expended or if work funded with match share has occurred after the notice of proposed award but before execution of the grant agreement. If no match funds have been expended or if no work funded with match share has occurred before execution, then state this in the report. All pre-execution match expenditures must conform to the requirements in the Terms and Conditions of this Agreement.

Product:

- Monthly Progress Reports

Task 1.5 Final Report

The goal of the Final Report is to assess the project's success in achieving the Agreement's goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

The objectives of the Final Report are to clearly and completely describe the project's purpose, approach, activities performed, results, and advancements in science and technology; to present a public assessment of the success of the project as measured by the degree to which goals and objectives were achieved; to make insightful observations based on results obtained; to draw conclusions; and to make recommendations for further projects and improvements to the FTD project management processes.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Recipient shall perform the following activities for both the public and confidential versions of the Final Report.

The Recipient shall:

- Prepare an Outline of the Final Report, if requested by the CAM.

- Prepare a Final Report following the latest version of the Final Report guidelines which will be provided by the CAM. The CAM shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed at least 60 days before the end of the Agreement Term.
- Submit one bound copy of the Final Report with the final invoice.

Products:

- Outline of the Final Report, if requested
- Draft Final Report
- Final Report

Task 1.6 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. Although the Energy Commission budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of Energy Commission funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Agreement Manager at least 2 working days prior to the kick-off meeting. 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 such 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 the:
 - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
 - Amount of each in-kind contribution, a description, documented market or book value, and its 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 shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
- Provide a copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured. For match funds provided by a grant a copy of the executed grant shall be submitted in place of a letter of commitment.
- Discuss match funds and the implications to the Agreement if they are reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.

- Provide the appropriate information to the Commission Agreement Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Agreement Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must be approved through a formal amendment to the Agreement and may trigger an additional CPR meeting.

Products:

- A letter regarding match funds or stating that no match funds are provided
- Copy(ies) of each match fund commitment letter(s) (if applicable)
- Letter(s) for new match funds (if applicable)
- Letter that match funds were reduced (if applicable)

Task 1.7 Identify and Obtain Required Permits

The goal of this task 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. Although the Energy Commission budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make any expenditure for which a permit is required.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Agreement Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies the:
 - Type of permit
 - Name, address and telephone number of the permitting jurisdictions or lead agencies
 - The schedule the Recipient will follow in applying for and obtaining these permits.
- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. The implications to the Agreement 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 the Progress Reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, provide the appropriate information on each permit and an updated schedule to the Commission Agreement Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Agreement Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Agreement Manager within 5 working days. Either of these events may trigger an additional CPR.

Products:

- Letter documenting the permits or stating that no permits are required
- A copy of each approved permit (if applicable)
- Updated list of permits as they change during the term of the Agreement (if applicable)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable)
- A copy of each final approved permit (if applicable)

Task 1.8 Obtain and Execute Subcontracts

The goal of this task is to ensure quality products and to procure subcontractors required to carry out the tasks under this Agreement consistent with the Agreement Terms and Conditions and the Recipient's own procurement policies and procedures. It will also provide the Energy Commission an opportunity to review the subcontracts to ensure that the tasks are consistent with this Agreement, and that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Manage and coordinate subcontractor activities.
- Submit a draft of each subcontract required to conduct the work under this Agreement to the Commission Agreement Manager for review.
- Submit a final copy of the executed subcontract.
- If Recipient decides to add new subcontractors, then the Recipient shall notify the CAM.

Products:

- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS**TASK 2 SCALE UP DME PLANT FROM PILOT TO DEMONSTRATION**

The goal of this task is to implement design modifications based on the pilot operation of the plant that will increase the sustainable DME production rate, improve operational stability, and accommodate renewable methanol feedstocks.

Regarding modifying the existing DME plant, adding fuel dispensers, and undertaking the field trial (i.e., the entire grant project), Recipient promises to the Energy Commission (and promises independently of any obligations to Imperial County) to abide by all of the terms and conditions of the "Agreement for Conditional Use Permit #12-0014, Oberon Fuels (APN 037-070-013-000) (Approved by Planning Commission on January 09, 2013)," between Imperial County Planning & Development Services Department and Oberon Fuels, Inc. ("hereafter CUP agreement"). Further, Recipient agrees to promptly send to the Energy Commission copies of all correspondence and reports between (i.e., both directions) Oberon Fuels, Inc. and the Imperial County Planning & Development Services Department related to the CUP agreement and the associated Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program. These correspondence and reports shall include without limitation, reporting under CUP agreement sections G-12 (Reports/Information), G-16 (Non-compliance), G-18 (Permits of other agencies incorporated [into the CUP agreement]), and S-13 (Reporting). Recipient shall send

such copies of correspondence and reports to the Commission Agreement Manager in a manner indicated by the CAM, to be decided in the CAM's sole discretion.

The Recipient shall:

- Engineer a design package that addresses the requirements identified in the goal and provides instruction for the construction contractors to implement the changes. The design package will include:
 - Reconfiguration of the internal structure and piping feed for the catalytic distillation column.
 - Automated pressure control loop.
 - Pretreatment system for removing sulfur species from the renewable methanol feedstock.
 - Inline sampling and measurement system for feedstock and product purity and critical contaminants.
 - Material handling equipment to allow for the delivery of methanol feedstock by rail car or ISO container.
 - A bill of materials (BOM) needed to implement the changes.
- Conduct a hazard and operability study (HAZOP) review of the design to ensure the implemented process is safe to operate.
- Update permitting authorities based on final design specifications.
- Procure pressure vessels, catalyst, instrumentation, and other outsourced components necessary for construction as specified in the design package BOM.
- Install the modifications and commission the modified plant.
- Establish baseline operating performance utilizing commodity grade methanol.
- Measure maximum sustainable throughput rate and required operator overrides to the autonomous control loop.
- Complete a Scale-up Operational Performance Report.

Products:

- Design Package
- HAZOP report
- Scale-up Operational Performance Report

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details.]

TASK 3 TEST DME PRODUCTION USING RENEWABLE METHANOL FEEDSTOCK

The goal of this task is to operate the DME plant with renewable methanol sourced from the Kraft pulp and paper process and assess the cost and performance impacts relative to commodity grade methanol.

The Recipient shall:

- Take delivery of renewable methanol and test composition for levels of sulfur species. Produce Methanol Testing Log.
- Process methanol through the pretreatment step and retest composition for levels of sulfur species. Produce Product DME Testing Log.
- Operate DME production process with renewable methanol for a minimum of 500 hours. Complete Operational Test Report including:
 - Impacts on throughput rate
 - Product DME composition relative to ASTM specification
 - Plant uptime

- Process operating conditions

Products:

- Methanol Testing Log
- Product DME Testing Log
- Operational Test Report

TASK 4 DME FUEL STATION INSTALLATION, OPERATION & TRAINING

The goals of this task are to complete the planning and installation of a fueling terminal and verify proper operations and readiness to support the field-testing. This task also includes providing the training and materials necessary to ensure safe and reliable operation of the fuel terminal and fuel.

The Recipient shall:

- Determine key fuel station requirements (e.g. storage tank size, number of pumps, etc.) and prepare Station Specification Report.
- Perform final site selection to best serve the operational duty cycle and drive schedules **for a future DME truck** demonstration.
- Review plans and documents for final design, installation, testing and validation of **the** DME fueling terminal.
- Manufacture, assemble, integrate, and build the DME fueling station.
- Conduct tests, certifications, and validations to ensure reliable and safe operation of installed fueling stations.
- Commission station. Prepare Written Summary of Station Commissioning Process.
- Develop training materials and provide training in safe operation of the fueling terminal to attendants, operators, drivers, and emergency responders (police, fire, paramedics).
- Ensure the delivered fuel product is free of contaminants and complies with ASTM D7901 standard.

Products:

- Station Specification Report
- Photographs of Construction Progress and Station Installation
- Written Summary of Station Commissioning Process
- Training Materials

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details.]

TASK 5 DEVELOP DME FUEL SYSTEM CONVERSION PLAN

The goal of this task is to **develop a technical pathway and commercialization plan for a DME fuel system conversion kit for diesel vehicles** to operate on 100% DME.

The Recipient shall:

- Review and plan functional requirements, duty cycle and drive schedules, and identify and prepare a Vehicle Specification for Conversion.
- **Work with a subject matter expert in diesel fuel systems to assess existing technologies and potential suppliers for DME fuel system components. Results will be delivered in White Paper on DME Fuel Injection System Availability Options.**

- **Create a DME Fuel System Request for Quote (RFQ). The RFQ will cover development of the DME fuel system which is comprised of fuel tanks, fuel pump, injectors, hoses, and an engine control unit.**
- Develop a DME Fuel System Conversion Kit Cost Estimate for commercial production and installation of DME fuel system conversion kits.
- **Develop a Conversion Kit Development Project Plan with a timeline and budget based on responses to the RFQ. Delivery of 5 units for on road testing with the fleet partners will be included in the scope, as well as follow-on work to certify and commercialize the kits.**

Products:

- **White Paper on DME Fuel Injection System Availability Options**
- **DME Fuel System RFQ**
- Vehicle Specification for Conversion
- DME Fuel System Conversion Kit Cost Estimate
- **Conversion Kit Development Project Plan**

[CPR WILL OCCUR DURING THIS TASK. See Task 1.2 for details.]

TASK 6 DME PROPANE BLEND TESTING AND DEPLOYMENT

The goal of this task is to **test DME blended into propane for motor fuel applications, establishing the technical requirements for commercial sale of DME as a propane blendstock.**

The Recipient shall:

- **Work with industry partners to develop and execute a three-phase plan for testing DME propane blend.**
 - **Phase One – material compatibility testing**
 - **Phase Two – engine emissions and performance lab testing**
 - **Phase Three – field testing of vehicles in real world duty cycles**
- **Support Phase One and Two of the testing plan by providing cylinders of blended fuel with 20% by weight and 30% by weight DME content.**
- **Provide DME for Phase Three field testing of vehicles.**
- **Work with industry partners to develop logistics for safe and efficient blending, transport, storage, and delivery of blended fuel.**
- **Work with appropriate regulatory authorities to meet requirements for the sale and taxation of blended fuel.**
- **Work with industry partners to operate a minimum of five existing propane vehicles using DME propane blended fuel and integrate these vehicles into regular operations with existing propane vehicle fleets in Southern California.**
- **Work with industry partners to capture key operating metrics, including miles driven, fuel consumed, unscheduled vehicle downtime, and driver feedback.**
- Develop cost and operational feasibility report based on **vehicle** operational data, fleet feedback, and fuel delivery costs. Prepare DME **Propane Vehicle** Cost and Operational Feasibility Report.

Products:

- **DME Propane Vehicle Testing Schedule**
- DME **Propane Vehicle** Cost and Operation Feasibility Report

Task 7 DATA COLLECTION AND ANALYSIS

The goal of this task is to collect operational data from the project, to analyze that data for economic and environmental impacts, and to include the data and analysis in the Final Report.

The Recipient shall:

- Develop a data collection plan.
- Troubleshoot any issues identified.
- Collect at least six months of data, including:
 - Throughput, usage, and operations data
 - Normal operating hours, up time, down time, and explanations of variations
 - Feedstock supply summary
 - Maximum capacity of the new fuel production system in diesel gallon equivalents (DGE) and ordinary units
 - Gallons of gasoline and/or diesel fuel displaced (with associated mileage information), along with value converted into DGE
 - Record of wastes from production processes (waste water, solid waste, criteria emissions, etc.)
 - Expected air emissions reduction, for example:
 - Non-methane hydrocarbons
 - Oxides of nitrogen
 - Non-methane hydrocarbons plus oxides of nitrogen
 - Particulate Matter
 - Formaldehyde
 - Duty cycle of the current fleet and the expected duty cycle of future vehicle acquisitions
 - Specific jobs and economic development resulting from this project
 - Levelized Cost of Fuel and Finished fuel price
 - Analysis of total facility costs, operation and maintenance costs, marginal abatement costs
- Comply with the Petroleum Industry Information Reporting Act (PIIRA) and complete CEC Form M810E and CEC Form M13 on a monthly basis for submission to the California Energy Commission's PIIRA Data Collection Unit.
- Provide a written record of registering with the Low Carbon Fuel Standard and Renewable Fuel Standard programs.
- Identify any current and planned use of renewable energy at the facility.
- Describe any energy efficiency measures used in the facility that may exceed Title 24 standards in Part 6 of the California Code Regulations.
- Provide data on potential job creation, economic development, and increased state revenue as a result of expected future expansion.
- Provide a quantified estimate of the project's carbon intensity values or provide an Air Resources Board approved pathway carbon intensity.
- Estimate annual life-cycle greenhouse gas emission reduction.
- Compare any project performance and expectations provided in the proposal to Energy Commission with actual project performance and accomplishments.
- Collect data, information, and analysis described above and include in the Final Report.

Products:

- Data collection information and analysis will be included in the Final Report

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: OBERON FUELS, 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 Amendment 1 to Agreement ARV-18-018 with Oberon Fuels, Inc. to shift from developing diesel-to-dimethyl ether (DME) engine conversion kits for trucks to validating the feasibility of utilizing a DME propane blend as a drop-in fuel for light- and medium-duty vehicles. Project activities to increase DME production from the existing plant remain unchanged; 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 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 August 12, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat