STATE OF CALIFORNIA

GRANTS/CONTINGENT AWARD REQUEST

CEC-270 (Revised 03/10) CALIFORNIA ENERGY COMMISSION

To: Grants and Loans Office Date: 01 / 16 / 2013

Project Manager: Bill Kinney Phone Number: (916) 654-4774 ext.

Office: Emerging Fuels Division: Transportation MS- 27

Project Title: Advanced Biorefinery Center—Mendota Integrated Demonstration Plant

Type of Request: *(check one)*

☒ **New Agreement:** *(include items A-F from below)* Agreement Number: ARV-12-033

Program: ARFVTP

Solicitation Name and/or Number: PON-11-601

Legal Name of Recipient: Mendota Bioenergy, LLC (MBLLC)

Recipient's Full Mailing Address: 1420 N. Floyd Ave.

Fresno, CA, 93723-9519

Recipient's Project Officer: William Pucheu Phone Number: (559) 779-3487 ext.

Agreement Start Date: 04 / 01 / 2013 Agreement End Date: 06 / 30 / 2015

☐ **Amendment :** *(Check all that apply)* Agreement Number:

- ☐ Term Extension – New End Date: / /
- ☐ Work Statement Revision *(include Item A from below)*
- ☐ Budget Revision *(include Item B from below)*
- ☐ Change of Scope *(include Items A – F as applicable from below)*
- ☐ Other: (Specify)

ITEMS TO ATTACH WITH REQUEST:

A. Work Statement
B. Budget
C. Recipient Resolution, if applicable. (Resolution may be requested in Special Conditions if not currently available.)
D. Special Conditions, if applicable.
E. CEQA Compliance Form
F. Other Documents as applicable
- Copy of Score Sheets
- Copy of Pre-Award Correspondence
- Copy of All Other Relevant Documents

California Environmental Quality Act (CEQA)

☐ CEC finds, based on recipient's documentation in compliance with CEQA:

- ☐ Project exempt: Section NOE filed: / /
- ☒ Environmental Document prepared: Negative Declaration NOD filed: 11 / 06 / 2013
- ☐ Other: Explain

☐ CEC has made CEQA finding described in CEC-280, attached

Funding Information:

*Source #1:	ARFVTP	Amount:	$ 4,998,399.00	Statute:	2011	FY:	11-12	Budget List #: 601-118D
*Source #2:		Amount:	$	Statute:		FY:		Budget List #:
*Source #3:		Amount:	$ 0.00	Statute:		FY:		Budget List #:

If federally funded, specify federal agreement number:

*** Source Examples include ERPA, PIER-E, PIER-NG, FED, GRDA, ARFVT, OTHER.**

Business Meeting Approval: *(refer to Business Meeting Schedule)*

Proposed Business Meeting Date: 02 / 28 / 2013 ☐ Consent ☒ Discussion

Business Meeting Participant: Bill Kinney Time Needed: (5 minutes)

Agenda Notice Statement: *(state purpose in layperson terms)*

Possible approval of a ☒ Grant / ☐ Contingent Award to…

Mendota Bioenergy LLC (MBLLC) to design, construct, and operate the $11.54-million Advanced Biorefinery Center-Mendota Integrated Demonstration Plants (IDP); including a 12-month harvest plan for 10,000 tons of energy beets; advanced enzyme and microbial conversion to 285,000 gallons of 200-proof advanced biofuel ethanol; supporting design of a future 40 million gallons per year (gpy).

Project Manager	Date	Office Manager	Date	Deputy Director	Date

Exhibit A
Scope of Work
Advanced Biorefinery Center—Mendota Integrated Demonstration Plant

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Agreement Management
2		Energy Beet Production
3		Design Phase
4		Pre-Construction
4.1		Final Agreements
4.2		Construction and Equipment List
4.3		Approval to Proceed to Construction
5	X	Construction
6		Plant Operations
6.1		Demonstrate Advanced Ethanol Production Plant
6.2		Demonstrate Anaerobic Digestion Plant
6.3	X	Demonstrate the Pilot Biodiesel Production Plant
6.4		Test Plan Preparation
7		Biofuels Development Analysis
7.1		Perform Lifecycle Analysis
7.2		Quantify Lifecycle Economic and Environmental Benefits
8		Coordination
8.1		Integration of Material and Information Flows
8.2		Optimize and Demonstrate Integrated Biorefinery Model
9		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Sharon Starcher--MBLLC, Jim Tischer—MBLLC, Bill Pucheu – MBLLC, Jeff Manternach, IR1	MBLLC*, IR1	
2	John Diener--RRR, Steve Kaffka--UCD, Jim Tischer--MBLLC, Cliff Ohmart--SureHarvest, Steve Libsack—Betaseed/KWS	DelTesta Harvesting; Cartel Transport, LLC; Energy-beet contracted farmers; MAABC; UCD; Fresno State; Betaseed; SureHarvest	
3	Jeff Manternach—IR1, Jim Moore—IR1, Joe Winkler—IR1	IR1	

4	Jeff Manternach—IR1, Jim Moore—IR1, , Joe Winkler—IR1	IR1	
4.1	Jeff Manternach—IR1, Jim Moore—IR1, , Joe Winkler—IR1	IR1	
4.2	Jeff Manternach—IR1, Jim Moore—IR1, , Joe Winkler—IR1	IR1	
4.3	Jeff Manternach—IR1, Jim Moore—IR1, , Joe Winkler—IR1	IR1	
5	Jeff Manternach—IR1, Jim Moore—IR1, Terry Kulesa—IR1, Joe Winkler—IR1	IR1	
6	Jeff Manternach—IR1, Jim Moore—IR1, Terry Kulesa—IR1, Joe Winkler—IR1	UCD, CSUF	
6.1	Jeff Manternach—IR1, Jim Moore—IR1, Terry Kulesa—IR1, Joe Winkler—IR1	IR1, RRR	
6.2	Ruihong Zhang--UCD	Cartel Transport, LLC, UCD	
6.3	John Diener--RRR, Russ Teall--BIODICO, Gary Bañuelos—USDA-ARS	RRR, BIODICO, USDA-ARS	
6.4	Jeff Manternach—IR1	IR1	
7	Jim Tischer--MBLLC, Jeff Manternach—IR1		
7.1	Alissa Kendall--UCD, Steve Kaffka--UCD	UCD	
7.2	Mark Jenner--UCD, Mickey Paggi--CSUF	UCD, CSUF	
8	John Diener--RRR, Jim Tischer--CSUF, Jeff Manternach—IR1, Ruihong Zhang--UCD, Steve Kaffka--UCD, Russ Teall--BIODICO		
8.1	John Diener--RRR, Jim Tischer--CSUF, Jeff Manternach—IR1, Ruihong Zhang--UCD, Steve Kaffka--UCD, Russ Teall--BIODICO	MBLLC*, MABBC, IR1, UCD, RRR, BIODICO	

8.2	Jeff Manternach—IR1	IR1, UCD, MBLLC*	
9	Jim Tischer—MBLLC, Ruihong Zhang—UCD, Jeff Manternach—IR1	IR1, MABBC, UCD	

* Applicant

GLOSSARY

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

Acronym	Definition
AB-CB	Advanced Biofuel and Cellulosic Biofuel
ABC-M	Advanced Biorefinery Center—Mendota
ARB	Air Resources Board
ARFVT	Alternative and Renewable Fuel and Vehicle Technology
BMP	Best Management Practices
CA-BCAM	California Biomass Crop Adoption Model
CA-GREET	California Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model
CARB	California Air Resources Board
CCM	Commission Contract Manager
CGE	Computable General Equilibrium
CI	Carbon Intensity
CNG	Compressed Natural Gas
CPR	Critical Project Review
CSUF	California State University, Fresno
EMFAC	Emissions Factors
GHG	Greenhouse Gas
GPM	Gallons per Minute
HP	Horsepower
HDT	Heavy Duty Truck
IDP	Integrated Demonstration Project
ILUC	Indirect Land Use Changes
IMPLAN®	Impact Analysis for Planning. For any given industry, the software model enables quantification of outputs (value of production), labor income, direct and indirect jobs and value added, both before and after taking into account the multiplier effects on the entire economy.
IR1	The IR1 Group
LCA	Lifecycle Analysis
LCFS	Low Carbon Fuel Standard
MABBC	Mendota Advanced Bioenergy Beet Cooperative
MBLLC	Mendota Bioenergy LLC
MGD	Million Gallons per Day
MJ	Mega joule
MPU	Modular Production Unit
MW	Megawatt

Acronym	Definition
PE	Partial Equilibrium
RIN	Renewable Identification Number
RRR	Red Rock Ranch
SCF	Standard Cubic Feet
TPY	Tons per year
UCD	University of California, Davis
USDA-ARS	United States Department of Agriculture—Agricultural Research Service
WWT	Waste Water Treatment

Background:
Assembly Bill 118 (Nùñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVT Program). The statute, subsequently amended by AB 109 (Nùñez, Chapter 313, Statutes of 2008), authorizes the Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The Energy Commission has an annual program budget of approximately $100 million and provides financial support for projects that:

- Develop and improve alternative and renewable low-carbon fuels;
- Optimize alternative and renewable fuels for existing and developing engine technologies;
- Produce alternative and renewable low-carbon fuels in California;
- Decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability;
- Expand fuel infrastructure, fueling stations, and equipment;
- Improve light-, medium-, and heavy-duty vehicle technologies;
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets;
- Expand infrastructure connected with existing fleets, public transit, and transportation corridors; and
- Establish workforce training programs, conduct public education and promotion, and create technology centers.

The California Energy Commission issued solicitation PON-11-601 to provide funding opportunities under the ARFVT Program for projects which either create new, low carbon fuel production facilities, or lower the carbon intensity of fuels produced at existing facilities. To be supported, a project must demonstrate both economically competitive yields and lower GHG potential than the Low Carbon Fuel Standard (LCFS) for corn ethanol or soy biodiesel pathways. In response to PON-11-601, Mendota Bioenergy LLC submitted application #38, which was recommended for funding under the round two Notice of Proposed Awards issued on October 5, 2012. Mendota Bioenergy LLC's Application is incorporated by reference to this Agreement in its entirety.

Problem Statement:

The primary problem that the project team is attempting to solve is the lack of a commercial-scale domestic source of cost-competitive, low-carbon-intensity transportation fuels. The principal barriers that hinder the development of such fuels and their widespread deployment in California are:

- **Insufficient Field Demonstrations**
  The design and construction of a biorefinery at the scope of the future $170-million, commercial-scale Advanced Biorefinery Center—Mendota (ABC-M) requires the integration of numerous biofuel production technologies. This project will provide a working pilot-demonstration of a commercial-scale ABC-M biorefinery, allowing design refinements based on field testing, and greatly lowering the investment risks for such a larger plant.

- **Biotechnological Challenges**
  The process of cost-effectively releasing sugars and oils from biomass can be quite challenging and costly at the scales required for commercial production. Therefore, this project will allow for the thorough testing and refinement of the final commercial-scale design.

Goals of the Agreement

The goals of the proposed demonstration project are to: 1) demonstrate technologies and processes necessary for commercial-scale California-based production of cost-competitive, low-carbon-intensity transportation fuels; 2) develop high-value biobased products; and 3) demonstrate that the proposed sources of renewable biomass for conversion into biofuels and biobased products are economically, environmentally, and socially sustainable and suitable for commercial scale-up on ABC-M. Mendota Bioenergy LLC ultimately seeks to create a production chain that produces renewable transportation fuels with a carbon intensity lower than any other gasoline substitute biofuels produced in the U.S.

Objectives of the Agreement:
At the end of the project, the project team will gather all data collected and compare all performance metrics targets below to actual results. The objectives of this project are to:

- **Develop Feedstocks**
  - Implement an innovative first-in-the-world "All Beets, All the Time" harvest plan, in which 10,000 tons of carbon-optimized energy beets are planted, grown, harvested, and transported (using a demonstrated paperless tracking system and infrared sampling system) from a total of 250 acres divided among nine growers local to the Integrated Demonstration Project (IDP). This Plan will demonstrate that year-round energy beet harvesting can be done cost-effectively.

    Performance Metrics:

    - Acres of Beets Planted (target = 250)

- Tons of Beets Harvested (target = 10,000)
- Energy Beet Crop Yield (target = 40 tons/acre)
- Dry Matter Content (target = 22.5%)
- Convertible Biomass Content (target = 90% dry matter)
- Number of Months in Which Harvesting Occurred (target = 12)

- **Develop Biofuels and Biobased Products**
  - Design, construct, and operate a pilot-scale plant that converts approximately 10,000 tons per year of carbon-optimized energy beets into 285,000 gallons of 200-proof ethanol. Includes integration of advanced enzyme process and microbial conversion technologies, never before used in the US, that will significantly increase ethanol yield per ton, and reduce capital costs and energy use on the commercial ABC-M.

    Performance Metrics:

    - Completion of Design Documents
    - Construction of Facility on Time & Budget
    - Tons of Beets Processed (target = 10,000)
    - Gallons of 200-proof AB-CB Ethanol Produced (target = 285,000)
    - AB-CB Ethanol Yield (target = 28 gal/ton)
  - Produce fertilizer through the anaerobic digestion of energy beet stillage and glycerin at the University of California, Davis (UCD) Biogas Pilot Plant.

    Performance Metrics:

    - Tons of Energy Beet Stillage and gallons of glycerin delivered to UCD Digester
  - Demonstrate use of locally sourced, low carbon, high-yield, salinity-tolerant varieties of canola and/or safflower used as feedstock in an existing, small-scale oil seed crushing and biodiesel production unit (BIODICO) at Red Rock Ranch to produce biodiesel (B20 blend) for project's energy beet cultivation, harvest, and transport equipment. Glycerin produced as a by-product will be tested as an accelerant for the co-digestion of multiple substrates at the UCD pilot digester.

    Performance Metrics:

    - Acres of Canola Planted (target = 40)
    - Canola Crop Yield (target = 0.89 tons/acre)
    - Canola Oil Content (target = 35%)
    - Biodiesel Yield (target = 0.9 gal/gal canola oil)
    - Gallons of Biodiesel Produced (target = 3,038)
    - Percentage of project equipment using project-produced biodiesel
    - Gallons of glycerin produced and delivered to UCD Digester

- **Analyze Biofuels Development**

The following objectives are not easily measured quantitatively. Thus, the success of these objectives will be judged on a qualitative basis. Progress on and completion of the task activities—regardless of their results and implications for commercial-scale ABC-M—will be evaluated by the Commission Agreement Manager on a regular basis, with timely feedback to the Recipient to ensure satisfactory completion.

- Calibrate California Biomass Crop Adoption Model (CA-BCAM) model for farms and production conditions and develop computer-based life cycle assessment (LCA) model tailored to the proposed biofuel production pathway.
- Measure and analyze the lifecycle environmental flows for beet production and calculate fuel carbon intensity from crop production data.
- Estimate the full supply chain burdens of chemical, water, and energy inputs; and waste, pollution, and product and co-product outputs.
- Use data from farmer interviews, CA-BCAM simulation, and the LCA model to calibrate Best Management Practice (BMP) assessment tools.

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 Recipient shall:

- Attend a "Kick-Off" meeting with the Commission Project 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 Project Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Project Manager will provide an agenda to all potential meeting participants.

  The administrative portion of the meeting shall include, but not be limited to, the following:
  - Discussion of the terms and conditions of the Agreement
  - Discussion of Critical Project Review (Task 1.2)
  - Match fund documentation (Task 1.6). No work may be done until this documentation is in place.
  - Permit documentation required (Task 1.7)
  - Discussion of subcontracts needed to carry out project (Task 1.8)

  The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Project Manager's expectations for accomplishing tasks described in the Scope of Work
- An updated Schedule of Products
- Discussion of Progress Reports (Task 1.4)
- Discussion of Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Discussion of the Final Report (Task 1.5)

The Commission Project Manager shall designate the date and location of this meeting.

Recipient Products:

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

Commission Project Manager Product:

- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

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.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Project Manager and as shown in the Technical Task List above. However, the Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Commission Project Manager and the Recipient and may include the Commission Grants Officer, the Fuels and Transportation Division (FTD) team lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Project Manager to provide support to the Energy Commission.

The Commission Project Manager 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. One of the outcomes of this meeting will be 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 the Terms and Conditions, Section 8). If the Commission Project Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Transportation Committee for its 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 on 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 Commission Project Manager 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.

Commission Project Manager 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 Project 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 Project 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 Project Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Commission Project 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)
- "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 research 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 Project 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.

Product:

- Monthly Progress Reports

Task 1.5 Final Report

The goal of the Final Report is to assess the project's success in achieving its 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.
- Prepare a Final Report following the approved outline and the latest version of the Final Report guidelines which will be provided by the Commission Project Manager. The Commission Project Manager 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:

- Draft Outline of the Final Report
- Final Outline of the Final Report
- 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 Project Manager at least 2

- 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 Project Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Project 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.

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 Project 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 Project Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Project Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Project 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)

Task 1.8 Obtain and Execute Subcontracts

The goal of this task is for Recipients to identify any subcontracts required to carry out the tasks under this Agreement and to procure them consistent with the terms and conditions of this Agreement 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, that the

budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Prepare a letter documenting the subcontracts required to conduct this Agreement, and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no subcontracts required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that subcontracts will be required during the course of the Agreement, provide in the letter:
  - A list of the subcontracts that describes the anticipated maximum budget and general scope of work for each,
  - A description of the procurement process to be used, and
  - The schedule the Recipient will follow in applying for and obtaining these subcontracts
- Submit a draft of the subcontract that will include a budget with the information required in the budget details to the Commission Project Manager for review.
- Submit a final copy of the executed subcontract.

Products:

- Letter describing the subcontracts needed, or stating that no subcontracts are required
- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS

TASK 2 ENERGY BEET PRODUCTION

The goals of this task are to plant, grow, harvest, and transport 10,000 tons of carbon optimized energy beets for the ABC-M IDP and demonstrate the viability of year-round energy beet harvesting.

The Recipient shall:

- Perform energy beet agronomic work for energy beets in the western San Joaquin Valley.
  - Monitor test plantings of beets and evaluate a range of fertilizer application rates for yield and quality.
  - Quantify optimum nitrogen use for winter-harvested energy beets.
  - Produce best management practice guidelines for pilot-plant contracted energy beet growers.
- Develop and implement a Best Management Practices (BMP) Self-Assessment Workbook Framework for energy beet growers. Use this framework as the basis for implementing a low-carbon pricing system in the future.

- Create an energy beet grower payment system based in part on the carbon intensity of the harvested beets.
- Employ a new ticketless tracking system and an on-board infrared sugar-content testing system to better manage energy beet harvest operations to reduce carbon and resource inputs.
- Secure contracts with local energy beet farmers who will use the BMPs to plant, grow, cultivate, and irrigate designated energy beet parcels, and supply approximately 10,000-tons of energy beets to ABC-M IDP during the period June 2013 to May 2014. Contracted farmers will measure cultural/harvest operation carbon inputs for their respective parcels and report same to Mendota Advanced Bioenergy Beet Cooperative monthly.
- Harvest and deliver energy beets to ABC-M IDP as directed.

Products:

- Best Management Practices Self-Assessment Workbook Framework
- Contracts with local energy beet farmers

TASK 3 DESIGN PHASE – Integrated Demonstration Plant (IDP)

The goal of this task is to design and engineer all components of the proposed Integrated Demonstration Plant.

The Recipient shall:

- Design and engineer a 285 thousand gallon per year ("285 KGPY") pilot scale Advanced Ethanol plant. This plant will be designed to produce approximately 285,000 gallons of 200-proof ethanol over the project period. Produce Design Package for Advanced Ethanol Plant that includes:

    - Piping & Instrumentation Diagrams (P&IDs)
    - General Arrangement Drawings
    - Equipment List
    - Electrical One Line Drawings

- Design and engineer modifications to the existing anaerobic digester located at the University of California, Davis Wastewater Treatment Plant. Produce modified Design Package for UCD Anaerobic Digester that includes:

    - Piping & Instrumentation Diagrams (P&ID) revisions
    - Equipment List
    - Installation details as necessary

Products:

- Design Package for Advanced Ethanol plant
- Modified Design Package for UCD anaerobic digester

TASK 4 PRE-CONSTRUCTION

Task 4.1 Final Agreements

The goal of this task is to obtain all final agreements necessary to begin construction.

The Recipient shall:

- Prepare an Agreements Letter documenting the agreements necessary to construct the project. At a minimum, this letter will include:
    - Land agreement for control of project site
    - Supply agreement with feedstock providers
    - Off-take agreement with fuel purchasers
- Secure the agreements as detailed in Agreements Letter

Products:

- Agreements Letter
- Records of necessary agreements

Task 4.2 Construction and Equipment List, Procurement Schedule, & Construction Estimate

The goal of this task is to finalize the project design and construction costs prior to incurring major construction expenses.

The Recipient shall:

- Prepare an Equipment List documenting the necessary equipment for the completion of the project. The Equipment List will include all items to be purchased, constructed, or installed on the project. For each item, the list shall provide:
    - The name of the item
    - The make, model, size, capacity or other information as appropriate to the item
    - The estimated cost to purchase each item
- Prepare a Procurement Schedule for the equipment identified on the Equipment List. The Procurement Schedule will identify the purchase orders needed to acquire the items on the equipment list and shall provide:
    - The name of the entity that will be carrying out the purchase and/or installation of the item
    - A description of the equipment, by item number, contained in each purchase order
    - The schedule for obtaining a binding bid from the supplying or installing entity
    - The schedule for placing each purchase order
    - The delivery schedule for each equipment item, by purchase order
- Prepare a Construction Estimate for the completion of the Integrated Demonstration Plant including the estimated costs for the:
    - Site work

- Foundations & structures
- Equipment
- Equipment installation
- Piping and electrical materials installation

Products:

- Equipment List
- Procurement Schedule
- Construction Estimate

TASK 4.3 Approval to Proceed with Construction

The goal of this task is to document preparedness to build the project and to secure Commission Agreement Manager written approval to begin incurring major construction costs.

The Recipient shall:

- Prepare a Written Notification of Readiness to Construct stating the project has obtained all permits, third party agreements, binding construction and equipment bids, and all other items necessary to begin construction.
- Develop proposed Construction Schedule identifying the necessary tasks and their durations from the projected start of construction until the commercial operations date of the project.

Products:

- Written Notification of Readiness to Construct
- Construction Schedule

TASK 5 CONSTRUCTION

The goal of this task is to construct the IDP and prepare it for operation.

The Recipient shall:

- Execute construction of the project as outlined in the Construction Schedule, Construction Estimate, Procurement Schedule, and Equipment List. The construction of the Integrated Demonstration Plant shall include the following major components:
    - Feedstock receiving and transfer system
    - Feedstock pre-processing system
    - Advanced Ethanol plant
    - Modifications to UCD anaerobic digester
    - Fuel distribution system
- Commissioning and start-up of the facility
- Prepare a Written Notification of Demonstration Operation and submit it to the Commission Agreement Manager within ten working days of commencement of

operations of the project for the intended demonstration usage. The Written Notification shall contain the following elements:
    - The date the project achieved commercial operation(s)
    - A narrative on the current status of the project and initial operations
    - Any changes made from the project schedule as originally proposed and reasons for those changes.
- Conduct Critical Project Review process as per Task 1.2. Prepare Critical Project Review Report.

Products:
- Written Notification of Demonstration Operation
- Critical Project Review
- Critical Project Review Report

TASK 6 PLANT OPERATIONS

The goal of this task is to operate the Advanced Ethanol Production Plant and Pilot Biodiesel Plant as planned and to begin to collect data to document the project's fulfillment of its objectives.

TASK 6.1 Demonstrate Advanced Ethanol Production Plant

The goal of this task is to demonstrate the Advanced Ethanol Production Plant that will produce approximately 285,000 gallons of 200-proof AB-CB Ethanol over the project period.

The Recipient shall:
- Demonstrate two innovative technologies: whole beet inventory storage and liquefied beet inventory storage.
- Operate the Advanced Ethanol plant for approximately 100 days over a 12-month period, complying with all applicable regulatory standards and producing approximately 285,000 gallons of 200-proof AB-CB Ethanol. As part of this process, consortium will integrate whole beet and liquefied inventory storage technologies described above.
- Distribute the 200-proof ethanol to local ethanol plant(s) and the spent stillage to the UCD Biogas Energy Pilot Plant and growers.
- Prepare Report on Operations in the Monthly Progress Reports. This reporting shall include, but is not limited to, the following information:
    - A narrative on operational highlights from the previous month, including any stoppages in production and a statement as to the project's compliance with regulatory requirements. (Note: Advanced Ethanol plant is designed for approximately 100 days of operations in a twelve-month

- The total amount of feedstock received and processed on a monthly basis
- The total amount of fuel produced on a monthly basis
- Conversion ratio for feedstock to fuel production
- The direct operational costs of the project, total and per volume of fuel.

Products:

- Report on Operations in the Monthly Progress Reports (see also Task 6.2)

TASK 6.2 Demonstrate the Pilot Biodiesel Production Plant

The goal of this task is to demonstrate and analyze the integration of Project-produced biodiesel into the feedstock production chain of AB-CB Ethanol.

The Recipient shall:

- Select varieties of high-yield, salinity-tolerant canola and safflower for use as feedstock for the biodiesel production unit.
- Use an estimated 36 tons of seed harvested from 40 acres of planted high-yield, salinity-tolerant varieties of canola to produce ~3,038 gallons of specification-grade B-100 biodiesel and then splash-blend it into B-20 biodiesel.
- Verify biodiesel quality at the Naval Base Ventura County, where BIODICO operates a facility.
- Arrange for delivery of the biodiesel for use in the energy beet tractors, cultivators, harvesters, beet delivery trucks, and IDP loaders, and of the glycerin for use as an accelerant at the UC Davis Biogas Pilot Plant.
- Determine the:
  - Benefits of using biodiesel over petroleum diesel and other fossil energy sources, and update data and assumptions currently used in economic and environmental models.
  - Cost of replacing petroleum diesel with biodiesel, including changes in equipment performance, maintenance, and storage.
  - Analyze the results with GREET 1.8b analysis tool.
- Include data from this task in Report on Operations in the Monthly Progress Reports described above in Tasks 6.1, 6.2 and submit as specified there.

Products:

- Report on Operations in the Monthly Progress Reports (see also Task 6.1)

TASK 6.3 Test Plan Preparation

The goal of this task is to prepare the test plan to be used during data collection and analysis.

The Recipient shall:

- Finalize the type of monitoring to be conducted.
- Determine the manner in which the team will validate, analyze, and report data. Such determination will be made at one or several of the Project's Quarterly Project Meetings. The data collected in Tasks 2, 6 & 7 will be shared among Project participants for use in accomplishing the analysis & reporting activities in Tasks 1, 7, 8 & 9.
- Conduct Critical Project Review process as per Task 1.2. Prepare Critical Project Review Report.

Products:
- Test Plan
- Critical Project Review
- Critical Project Review Report

TASK 7 BIOFUELS DEVELOPMENT ANALYSIS

The goal of this task is to evaluate the potential of this project to develop an environmentally sustainable domestic source of renewable biomass for conversion to biofuels, bioenergy, and biobased products. To achieve this goal, several models and assessment tools will be integrated in an innovative manner to create accurate estimates of lifecycle effects of energy beet production and transformation to advanced fuels.

TASK 7.1 Perform Lifecycle Analysis (LCA)

The goal of this task is to perform a lifecycle analysis.

The Recipient shall:
- Calibrate the California Biomass Crop Adoption Model (CA-BCAM) model for farms and production conditions within the project's nine major farming regions.
- Develop data for direct integration into LCA model.
- Develop a computer-based LCA model tailored to the proposed biofuel production pathway. This LCA model will be made available to research partners to assist in decision-making over the entire supply chain. The model will calculate net environmental flows (inputs and emissions) over the entire life cycle (beet production, transport, and conversion facility), considering agronomic practices, soil quality, water quality and water use, the generation or reduction of hazardous or toxic substances, greenhouse gas and criteria air emissions. The model will use outputs from economic modeling, biogeochemical models, and life cycle databases available at UC Davis.
- Document the LCA modeling and results in an LCA Report.
- Measure and analyze the lifecycle environmental flows for beet production.
- Consider the allocation of emissions from crop rotation and the multiple co-products produced from the IDP and, ultimately, from ABC-M.
- Calculate fuel carbon intensity from crop production data.

Products:

- Lifecycle Analysis Report

TASK 7.2 Quantify Lifecycle Economic, Social and Environmental Benefits

The goal of this task is to quantify the project's lifecycle economic and environmental benefits.

The Recipient Shall:

- Quantify whole farm management effects resulting from energy beet crop adoption on farms throughout feedstock production region.
- Link field-level record keeping data to CA-BCAM and LCA models.
- Develop an LCA model that includes beet production, transport, and ABC-M facility construction and operation.
- Quantify the net environmental flows attributable to beet production, including direct estimates of changes to water use, fertilizer, and the generation of air emissions and related toxics from the operation of equipment, transport of product, and production of fertilizers and pesticides.
- Estimate the full supply chain burdens of chemical, water, and energy inputs; and waste, pollution, and product and co-product outputs.
- Quantify the economic, social and environmental benefits of using IDP-produced biodiesel in the energy beet production supply chain.
- Use data from farmer interviews, CA-BCAM simulation, and the LCA model to calibrate Best Management Practice (BMP) assessment tools and help monitor subsequent improvements in cropping system resource use efficiency.
- Utilize IMPLAN (Impact Analysis for Planning) software and accompanying 2009 dataset to determine multiplier effects created by the operation of ABC-M.
- Develop Lifecycle Benefits Report that documents the benefits of integrating environmental, economic, and social modeling efforts, and will provide producers with BMP for decision-making that integrates across environmental, economic, and social impacts.

Products:

- Lifecycle Benefits Report

TASK 8 COORDINATION

TASK 8.1 Integration of Material And Information Flows

The goal of this task is to integrate the material and information flows among Tasks 2, 6, and 7.

The Recipient shall:

- Manage the material and information flows among project participants and technical areas.
- Manage delivery of:

- o IDP-produced biodiesel to energy beet growers and truckers for use in their diesel engines.
- o Canola to Oilseed Crusher and BIODICO unit.
- o Biodiesel to Energy Beet growers
- o Energy beets to Ethanol Plant
- o 200-proof AB-CB Ethanol to local ethanol plant(s)
- o Spent stillage from ethanol plant to UCD AD facility
- o Spent stillage from ethanol plant to energy beet growers for fertilizer
- o Fertilizer from UCD AD facility to energy beet growers for fertilizer
- o Glycerin from UCD AD facility to biodiesel plant

Products:

- None. Information will be included in the Final Report.

TASK 8.2 Optimize and Demonstrate Integrated Biorefinery Model

The goal of this task is to optimize and demonstrate an integrated biorefinery model.

The Recipient Shall:

- Modify existing IR1 Group financial models for IDP AB-CB Ethanol and digester operations, producing an Integrated Production and Financial Model for use in activities in support of commercial-scale ABC-M.
- Combine the modified financial models with data generated from IDP operations to create integrated financial model for the ultimate commercial scale ABC-M.
- Support data collection and analysis activities for the biorefinery components mentioned above through onsite visits by UCD personnel, who will collect and compile data about raw feedstock, intermediate process streams, and final product streams, as well as operations and economic information necessary to support technical, economic or LCA assessment.

Products:

- Integrated Production and Financial Model

TASK 9 DATA COLLECTION AND ANALYSIS

The goal of this task is to collect and analyze operational data to determine the economic viability and environmental impact of the project. Final analysis of all project data must be included in the Final Report.

The Recipient Shall:

- Collect, unless a lesser amount is approved in writing by the Commission Agreement Manager, 6 months anaerobic digester and 12 months Advanced Ethanol operational data from fuel production system to include:

    - Time operating (up and down time),
    - Efficiency of conversion of feedstock,
    - Biofuel production rate,
    - Quality and quantity of fuel produced,
- Estimate gasoline and/or petroleum-based diesel fuel that will be displaced annually.
- Explain how the project will reduce criteria air pollutants and air toxics and reduce or avoid multimedia environmental impact, and lead to a decrease, on a life cycle basis, in emissions of water pollutants or any other substances known to damage human health or the environment.
- Explain how the project incorporated and achieved the sustainability goals.
- Provide a quantified estimate of the project's carbon intensity values for life-cycle scale greenhouse gas emissions.
- Quantify any water efficiency and water use reduction measures used in the project including, but not limited to, the use of recycled or reclaimed water and the reduction or elimination of point and nonpoint source wastewater discharge.
- Describe any potential use of renewable energy or cogeneration in the project.
- Describe any potential energy efficiency measures used in the project that would exceed Title 24 standards in Part 6 of the California Code of Regulations.
- Provide data on expected job creation, economic development, and increased state revenue.
- Compare any project performance and expectations provided in the proposal to Energy Commission with actual project performance and accomplishments.
- Describe how the project supports new technology advancement for vehicles, vessels, engines, and other equipment, and promote the deployment of such technologies in the marketplace. To the extent possible describe how the project, provided a measurable transition from the nearly exclusive use of petroleum fuels to a diverse portfolio of viable alternative fuels that meets California's petroleum reduction and alternative fuel use goals.
- Describe how the project demonstrated the cost-effectiveness of the proposed technology in achieving greenhouse gas emissions reduction.
- Provide additional data that may be requested by the Energy Commission during the term of this Agreement, as is reasonably available.

Products:

- Information will be included in the Final Report.