

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement ARV-15-009 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
600 Fuels and Transportation Division	Elyse Cheung-Sutton	27	916-654-4732

Recipient's Legal Name	Federal ID Number
Altex Technologies Corporation	77-0085545

Title of Project
Biomass Conversion to Synthetic Gasoline System (BCSGS)

Term and Amount	Start Date	End Date	Amount
	11 / 20 / 2015	9 / 1 / 2018	\$ 999,993

Business Meeting Information
 ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	11 / 12 / 2015	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
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Business Meeting Presenter	Elyse Cheung-Sutton	Time Needed:	5 minutes
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Please select one list serve. Altfuels (AB118- ARFVTP)

Agenda Item Subject and Description

ALTEX TECHNOLOGIES CORPORATION. Proposed resolution approving Agreement ARV-15-009 with Altex Technologies Corporation for a \$999,993 grant to develop and demonstrate an energy-efficient and cost-effective technology to convert California forest residue and energy crops to renewable gasoline (a drop-in fuel that is fully fungible with petroleum-based gasoline). Altex will assess the technical and economic feasibility of scaling up the 1 barrel per day Biomass Conversion to Synthetic Gasoline System (BCSGS) to a commercial facility. (ARFVTP Funding) Contact: Elyse Cheung-Sutton. (Staff Presentation: 5 minutes)



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. (Attach draft NOE)
 Statutory Exemption. List PRC and/or CCR section number: _____

Categorical Exemption. List CCR section number: 15301, 15304

Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:
 Cal. Code Regs., tit. 14, sec. 15301 provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of use beyond that existing at the time of the lead agency's determination, are categorically exempt from the provisions of the California Environmental Quality Act. This project involves modifications to an existing coal-and-biomass-to-liquids (CBTL) system. The existing system is in a laboratory room and consists of a reactor, tubing, and other minor equipment. Modifications to the existing system will include small additions such as valves, tubing, fans, and a small conversion reactor, all of which will fit into the current lab space and which are similar to existing equipment. The new equipment will not expand the capacity of the existign facility; rather, it will enable the project applicant to convert 100% biomass to renewable gasoline, as opposed to conversion of a mixture of biomass and coal. Therefore, this project is categorically exempt pursuant to section 15301.

Cal. Code Regs., tit. 14, sect. 15304 provides that projects which consist of minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry and agricultural purposes are categorically exempt from the provisions of CEQA. The biomass used for testing purposes in this pilot facility will be sourced from existing forest residues in Blodgett Forest Station in Georgetown, CA and existing energy crops from UC Davis. Forest residues are plant materials left by harvesting operations; this project does not remove any trees but rather will collect waste that is already being generated from forest management. The energy crops from U.C. Davis include wheat straw and switchgrass. They are plants already grown for the specific purpose of producing energy and are harvested regularly for testing and analysis. The estimated amount of biomass (both forest residue and energy crops) necessary for this project is approximately 20 tons, which is about 1.5 truck loads. Therefore, this project is categorically exempt pursuant to section 15304.

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

- Check all that apply
- | | |
|---|---|
| <input type="checkbox"/> Initial Study | <input type="checkbox"/> Environmental Impact Report |
| <input type="checkbox"/> Negative Declaration | <input type="checkbox"/> Statement of Overriding Considerations |
| <input type="checkbox"/> Mitigated Negative Declaration | |

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

Legal Company Name:	Budget
The Pennsylvania State University	\$ 99,999
Unitel Technologies, Inc.	\$ 77,041
	\$ 0

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

Legal Company Name:
University of California, Davis
Argonne National Laboratories

GRANT REQUEST FORM (GRF)

Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
ARFVTF	15/16	601.118H	\$999,993
Funding Source			\$
R&D Program Area:	Select Program Area	TOTAL:	\$999,993
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer				Recipient's Project Manager			
Name:	Dr. John Kelly			Name:	Dr. Mehdi Namazian		
Address:	244 Sobrante Way			Address:	244 Sobrante Way		
City, State, Zip:	Sunnyvale, CA 94086			City, State, Zip:	Sunnyvale, CA 94086		
Phone:	408-328-8302	Fax:	408-328-8313	Phone:	408-328-8303	Fax:	408-328-8313
E-Mail:	john@altexotech.com			E-Mail:	mehdi@altexotech.com		

Selection Process Used	
<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: PON-14-602
<input type="checkbox"/> First Come First Served Solicitation	

The following items should be attached to this GRF	
1. Exhibit A, Scope of Work	<input checked="" type="checkbox"/> Attached
2. Exhibit B, Budget Detail	<input checked="" type="checkbox"/> Attached
3. CEC 105, Questionnaire for Identifying Conflicts	<input checked="" type="checkbox"/> Attached
4. Recipient Resolution	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached
5. CEQA Documentation	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached

_____ Agreement Manager	_____ Date	_____ Office Manager	_____ Date	_____ Deputy Director	_____ Date
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Exhibit A SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1		Administration
2		Feedstock Acquisition
3		Plant Design, Fuel Cost, and Life Cycle Analysis
4		System Design Modifications
5	X	Catalyst Improvement and Supply
6		System Upgrade and Verification
7		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Mehdi Namazian	Penn State University (PSU), Unitel Technologies	
2	Mehdi Namazian, Nehru Chevanan		University of California Davis (UCD)
3	Mehdi Namazian, Ken Lux	Unitel Technologies	Argonne National Laboratories (ANL)
4	Mehdi Namazian, Ken Lux	Unitel Technologies	PSU
5	Mehdi Namazian, Ken Lux	PSU	
6	Mehdi Namazian, Ken Lux	Unitel Technologies	UCD
7	Mehdi Namazian, Ken Lux	PSU, Unitel Technologies	ANL, UCD

GLOSSARY

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

Term/ Acronym	Definition
ANL	Argonne National Laboratories
ARFVTP	Alternative and Renewable Fuel and Vehicle Technology Program
ASTM	American Society for Testing and Materials
BCSGS	Biomass Conversion to Synthetic Gasoline System

Term/ Acronym	Definition
BPD	Barrels Per Day
CAM	Commission Agreement Manager
CBTL	Coal and Biomass to Liquids
CPR	Critical Project Review
DOE	Department Of Energy
Energy Commission	California Energy Commission
FPR	Fuel Production Reactor
FTD	Fuels and Transportation Division
GHG	Greenhouse Gas
LCA	Life Cycle Analysis
P&ID	Piping and Instrumentation Diagram
PFD	Process Flow Diagram
PSU	Pennsylvania State University
Recipient	Altex Technologies Corporation
UCD	University of California, Davis

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 policies. AB 8 (Perea, Chapter 401, Statutes of 2013) re-authorizes the ARFVTP through January 1, 2024, and specifies that the Energy Commission allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational. 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 Energy Commission issued solicitation PON-14-602 entitled “Biofuels Early & Pre-Commercial Technology Development” under the ARFVTP on October 27, 2014. The purpose of this competitive grant solicitation was to support projects emphasizing transformative technology solutions to significant biofuels industry problems that increase yields, productivity, or cost effectiveness of biofuel production; and/or that target a significant unmet need in California’s biofuels industry. To be eligible for funding under PON-14-602, projects must also be consistent with the Energy Commission’s ARFVTP Investment Plan, updated annually. In response to PON-14-602, Altex Technologies Corporation (Recipient) submitted application number 33, which was proposed for funding in the Energy Commission’s Notice of Proposed Awards on June 24, 2015. PON-14-602 and Recipient’s application number 33 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 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.

The Recipient has been working with the U.S. Department of Energy (DOE) on developing a process to convert a mixture of coal and biomass to jet fuel, since 2012. The Recipient has made consistent progress in this endeavor and is now nearing completion of a DOE sponsored effort to demonstrate the Coal-and-Biomass-to-Liquids (CBTL) System, the title of which vests with the Recipient. The Recipient has also recently been awarded a second DOE project to further develop this technology, referred to as the Green House Gas Reduced Coal and Biomass to Liquid Based Jet Fuel (GHGR-CBTL) System, which scales up the CBTL capacity, from the existing .3-BPD to 1-BPD, and increases the technology readiness level (TRL) from 4 to 5. The ground work that the Recipient has completed with the DOE allows for greater leveraging of Energy Commission funds. The Recipient will use the equipment developed, data gathered, and experience gained through the DOE efforts to successfully complete this project with the Energy Commission.

Problem Statement:

In 2010, about 27.5 million vehicles in California consumed roughly 14.8 billion gallons of gasoline and 3.3 billion gallons of diesel, and produced around 150 million tons of greenhouse gasses (GHGs) per year. While there are commercially viable biodiesel technologies available to reduce the diesel carbon footprint, the only solution to reducing the gasoline carbon footprint is by adding ethanol to fuel. This approach is limited, however, and cannot be the sole liquid gasoline substitute use to meet California’s aggressive targets for reducing GHGs from transportation fuel. Advancement in drop-in gasoline production from biomass has been hindered by technical and economic barriers. While there have been some successes in production of a synthetic fuel from biomass, cost is high, mainly due to the high temperatures required in the process. A transformative technology solution is required to produce a cost-competitive, biomass-based gasoline with a much lower carbon footprint than fossil fuels.

Goals of the Agreement:

The goal of this Agreement is to develop a technically and economically feasible Biomass Conversion to Synthetic Gasoline System (BCSGS) that will produce gasoline from cellulosic biomass at less than \$2 per gallon with carbon intensity of less than 30 g-CO₂/MJ. This goal will be achieved by operating a 1- barrel-per-day (BPD) BCSGS, producing drop-in gasoline, using the test system data to design a 3,000-BPD BCSGS plant, and verifying the fuel cost and carbon foot print. The general approach to this project will be to:

- Obtain the necessary feedstock,
- Design and analyze a full scale, 3,000-BPD BCSGS,
- Utilize the full scale plant data to optimally design the 1-BPD BCSGS,
- Improve and produce the catalyst that will be used in the BCSGS,
- Fabricate the 1-BPD BCSGS, and
- Operate the 1-BPD BCSGS to verify functionality and fuel production.

Objectives of the Agreement:

The objectives of this Agreement are to:

1. Produce a 1-BPD BCSGS, which operates on biomass and produces gasoline.
2. Advance the BCSGS catalyst to maximize the gasoline yield.
3. Demonstrate the BCSGS and produce gasoline at a rate of 1-BPD.
4. Assess the technical performance of the BCSGS.
5. Assess the economic performance of the BCSGS at the full scale (3,000-BPD).
6. Assess the carbon intensity of the full-scale BCSGS by using life cycle analysis (LCA) and defining the plant carbon foot print.

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 Commission Agreement Manager (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 CAM, the Commission Agreement Officer (CAO), and a representative of the Energy Commission Accounting Office. The Recipient shall bring their Project Manager, Agreement Administrator, Accounting Officer, and any others determined necessary by the Recipient or specifically requested by the CAM 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 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 CAM 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 Agreement 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 CAM, and the Commission Agreement Officer. 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
- Draft Final Report (no less than 60 days before the end term of the agreement)
- 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:

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

TECHNICAL TASKS

TASK 2 Feedstock Acquisition

The goal of this task is to identify and acquire the needed feedstock. The recipient will obtain at least three different biomass materials including but not limited to: wheat straw, switchgrass/miscanthus, and forest residue. The estimated amount of biomass needed is 20 tons.

The Recipient shall:

- Identify the amount and type of biomass needed for testing and the vendor.
- Order and receive the biomass.

Products:

- Feedstock Acquisition Report including:
 - Biomass List, discussing types and amounts of biomass needed
 - Vendors of biomass
 - Acquisition Plan
 - Description of execution of Acquisition Plan

TASK 3 Plant Design, Fuel Cost, and Life Cycle Analysis

The goal of this task is to develop a full scale, 3,000-BPD BCSGS design, update the economics model and life-cycle analysis (LCA) model, and determine the full scale plant's fuel cost and carbon intensity. A process flow diagram (PFD) will be developed for the BCSGS and then translated into a process flowsheet in process simulation software. The results of the software simulations and optimization will be translated into an updated PFD. An available model (developed previously by the Recipient under a Defense Advanced Research Projects Agency effort) will then be used to determine the capital and operating costs of the system. The design and software simulations for the full scale system will inform the fabrication and testing of the 1-BPD BCSGS system in Tasks 6 and 7.

The Recipient shall:

- Design a full-scale 3,000-BPD BCSGS.
- Upgrade the economics model and define the plant and fuel cost.
- Develop an LCA model and define the plant carbon intensity.
- Simulate BCSGS 3,000-BPD process electronically.
- Create updated PFD.

Products:

Full Scale Plant Design Report including:

- Discussion of initial PFD,
- Process simulation software output,
- Updated PFD,
- Plant cost data and fuel cost data,
- Summary of inputs, assumptions, and results of LCA Model, and
- Comparison of Task 3 Results with the stated project goal of a drop-in gasoline from biomass at less than \$2 per gallon with a carbon intensity of less than 30 g-CO₂/MJ.

TASK 4 System Design Modifications

The goal of this task is to design the feed system and the Fuel Production Reactor (FPR) of the 1-BPD BCSGS. The FPR must also be designed to consider the BCSGS catalyst characteristics and to be optimized for the type of fuel being produced.

The Recipient shall:

- Produce Process Flow Diagram (PFD) and Piping and Instrumentation Diagram (P&ID) for the 1-BPD BCSGS.
- Modify the feed system by selecting, procuring, and integrating a screw type metering device which force feeds materials, and optimizing operating conditions.

- Design FPR to consider differences in the packing density of the catalyst and other various parameters.

Products:

- Task 4 Report including:
 - PFD
 - P&ID
 - Components Design

TASK 5 CATALYST IMPROVEMENT AND SUPPLY

The goal of this task is to improve the performance of the BCSGS catalyst and produce the amount of catalyst necessary for this project. The catalyst will be modified to maximize gasoline yield in the BCSGS system. Optimized operating conditions for catalyst regeneration will also be identified. After these optimizations have been made, the Recipient will produce the amount of catalyst needed for the 1-BPD BCSGS.

The Recipient shall:

- Improve the catalyst formulation and define the optimum operating conditions.
- Improve the catalyst regeneration properties.
- Produce the catalyst needed for the 1-BPD BCSGS.

Products:

- Catalyst Report including discussion of:
 - Improvement of catalyst performance and regeneration
 - Catalyst production for use in the 1-BPD BCSGS
 - Photographs of produced catalyst

[CPR will occur during this Task. See Task 1.2 for details.]

TASK 6 SYSTEM UPGRADE AND VERIFICATION

The goal of this task is to fabricate, test, and integrate Task 4 components to produce a 1-BPD BCSGS. Once the 1-BPD system has been constructed, the Recipient will perform a shakedown of the system to define the best operating conditions and to verify component and system operation.

The Recipient shall:

- Produce a Verification Test Plan outlining the procedures for verifying individual components of the feed and fuel conversion system.
- Fabricate the feed system by integrating a new metering device, modifying the existing scaffolding, support frames, and operating conditions for biomass as necessary.

- Fabricate the fuel production reactor.
- Verify the fabricated components.
 - Where practical, components will be tested as stand-alone units.
- Integrate the fabricated components into the 1-BPD system.
- Shakedown the system in order to define the best operating conditions.

Products:

- Verification Test Plan
- Equipment list
- Task 6 Report including:
 - Verified test data
 - Discussion of completed testing, results, and best operating conditions of the BCSGS
 - Photographs of fabricated feed and fueling systems

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 will verify that the BCSGS can use forest biomass and energy crops to produce drop-in gasoline at a rate of 1-BPD. The Recipient will also verify that the fuel produced meets ASTM D4814 (Standard Specification for Automotive Spark-Ignition Engine Fuel).

The Recipient shall:

- Produce a data collection test plan.
- Troubleshoot any issues identified.
- Collect at least one month of throughput, usage, and operations data from the 1-BPD BCSGS including, but not limited to:
 - Maximum capacity of the new fueling system and
 - Verification that produced fuel meets ASTM D4814,
- 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 Test Plan
- Data Collection Information and Techno-Economic Analysis (Information Submitted as Part of Final Report)

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: ALTEX TECHNOLOGIES CORPORATION

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

RESOLVED, that the Energy Commission approves Agreement ARV-15-009 from PON-14-602 with Altex Technologies Corporation for a \$999,993 grant to develop and demonstrate an energy-efficient and cost-effective technology to convert California forest residue and energy crops to renewable gasoline, a drop-in fuel that is fully fungible with petroleum-based gasoline. This project will assess the technical and economic feasibility of scaling up their 1 barrel per day Biomass Conversion to Synthetic Gasoline System (BCSGS) to a commercial scale facility; and

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

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on November 12, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Tiffani Winter,
Secretariat