

**Proposed Amendment between California Energy Commission
and
San Francisco Public Utility Commission**

Title: Brown Grease Recovery and Biofuel Production Demonstration
Amount: \$0.00
Term: 12 months
Contact: Abolghasem Edalati
Committee Meeting: 2/22/2011

Recommendation

Approve this agreement with San Francisco Public Utilities Commission (SFPUC) for a 12 month no cost time extension, to address the delays to the project due to a delay in the timing of the award, contractual negotiations with the technology providers, and by unexpected issues resulting from the implementation of the demonstration pilot plant. The extension will provide time to complete the remaining tasks of demonstrating the use of trap waste fats, oils, and grease (FOG, a.k.a. "brown grease" or "trap grease") to produce biofuels feedstock and to produce biodiesel as transportation fuel from that feedstock. Staff recommends placing this item on the consent calendar of the Commission Business Meeting.

Issue

On April 11, 2007, the Energy Commission formally awarded this grant project jointly to Metcalf & Eddy, Inc., (M&E) and the San Francisco Public Utilities Commission (SFPUC) to demonstrate and assess the feasibility of beneficially reusing restaurant waste grease or also known as waste fats, oil and greases (FOG). The project's goal was to demonstrate the technical and economic feasibility of using waste FOG as a lower-cost feedstock to produce biodiesel fuel, in support of the SFPUC's comprehensive FOG control program. However, the project encountered very significant delays following the award date before the grant was fully executed and during the implementation of the project. A detailed timeline highlighting project milestones and causes of delays is found in the next section (Background) and summarized as follows:

- M&E decided to withdraw from the project after months of negotiation to revise the scope of work and budget. The grant agreement was subsequently revised with SFPUC as the prime recipient and which was fully executed in April 2008.
- A year of delay in executing the agreement caused the technology providers to withdraw their support because they could no longer commit the resources to which they had originally agreed to. Contract negotiation with replacement technology providers caused further delays to the project.
- SFPUC have installed two pilot facilities at its Oceanside Water Pollution Control Plant (OSP), which is designed to process up to 10,000 gal/day of restaurant grease trap waste. The first plant ("brown grease skid") will be used to recover a viable biofuels feedstock from trap waste grease. The second plant ("biodiesel skid") will be used to convert that feedstock into biodiesel.
- Problems with the screening of the trap waste in the receiving station at the brown grease skid, and some process design issues with the glycerin removal, fuel distillation, and methanol recovery systems of the biodiesel skid caused an unavoidable one-year delay in data collection. The brown grease

skid appears to be working properly at this time, whereas the biodiesel skid still requires retrofits to become operational.

These delays noted above are beyond the control of SFPUC. Thus, SFPUC is requesting a no-cost time extension of one-year in order to complete a six-month demonstration period to collect representative data and to prepare the final reports. This extension will allow t the final reports to be able to draw meaningful conclusions, fulfill the obligations of the Energy Commission's grant, and meet the intent of the CEC goals. The biodiesel technology is still in its infancy, and data and reports retrieved from this work will help to advance the industry's understanding of the challenges and benefits of brown grease to biodiesel conversion. In particular, data that are being collected on the brown grease skid and reports related to this skid will be very helpful to other municipalities wishing to enter into a trap grease program. Finally, the SFPUC has incurred significant expenses, in excess of the CEC match, for this project and the SFPUC management team is committed to project completion.

Background

This project is a product of the Biofuels RD&D Grant Solicitation that was released on October 31, 2006. The goal of this PIER Renewables Program solicitation was to fund projects, as grants for the development of biofuel energy technologies and biorefineries for the production of transportation fuels such as ethanol, biodiesel, biomethane and co-produce heat, power and other bio-based products using lignocellulosic biomass resources from agriculture, forestry and municipal waste stream including food processing waste, waste beverages, waste grease, and purpose-grown or energy crops. The Notice of Proposed Award (NOPA) for this solicitation was issued by the Energy Commission in March 2007.

This project was formally approved for funding at a Business Meeting on April 11, 2007 with M&E and SFPUC as joint recipient. However, M&E eventually withdrew from the project, leaving SFPUC as the prime recipient of the grant agreement that was fully executed in April 2008 after one year of negotiations. These circumstances as well as other causes of significantly delays and project milestones are outlined in the following timeline:

- April 11, 2007 - the project approved at the California Energy Commission (CEC) business meeting to Metcalf & Eddy (M&E) and San Francisco Public Utility Commission (SFPUC).
 - o Between April 2007 and September 2007, M&E worked with the Energy Commission staff to revise scope and budget
 - o January 2, 2008 - a revised scope of work was submitted to the Energy Commission that named M&E, URS and SFPUC as project participants
 - o February 5, 2008 -a revised scope was submitted by SFPUC to the Energy Commission removing M&E as prime recipient as M&E attorneys determined that they could not accept the Energy Commission's T&C because contract termination was limited to "termination for cause," which could compromise federal contracts. The Energy Commission started working with SFPUC (the other joint recipient) instead of M&E. Scope of work and the budget for the agreement was revised in consultation with staff from Grants and Loans and Legal offices.

- March 26, 2008 - the Energy Commission issued Grant Fact Sheet to SFPUC for signature - the start date of April 11, 2007 was issued by G&L office.
- April 2008 - agreement with SFPUC was fully executed. By April 2008 the original proposed vendor, Superior Process Technologies (SPT) (Biodiesel Facility) (who had been waiting over one year to begin the project) withdrew their support. The original grant assumed that vendors would supply equipment commitments to provide the equipment at no cost to the SFPUC. Given that at this point the project was one year behind schedule, things had changed for the two vendors. SFPUC now had to consider other vendors and develop contracting vehicle to obtain equipment.
 - o April 17, 2008 - SFPUC met with WesTech Engineering, an original partner. WesTech could no longer commit the resources to which they had originally agreed.
 - o May 21, 2008 - CEC staff met with URS staff representative of SFPUC to move the project agreement forward; the Energy Commission agreed to give SFPUC additional time (4-6 months) to identify the SFPUC's technology partner for the biodiesel portion of the project (because SPT dropped out); this means the SFPUC was given until November 2008 to get an agreement in place for biodiesel technology provider
- June 25, 2008 - Project "administrative" kick-off meeting
 - o June 27, 2008 - Fry-o-Diesel (aka Black Gold Biofuels - BGB) met with SFPUC
 - o August 1, 2008 CEC staff and project's team held a technical kick-off meeting on the project site.
 - o January 28, 2009 - SFPUC signs Purchase Order Agreement with Fry-o-Diesel
 - o April 17, 2009 - Significant delays with Biodiesel equipment provider - SFPUC still negotiating T&C with Fry-o-Diesel
 - o May 5, 2009 - still negotiating T&C with RSI (Brown Grease Recovery Facility)
 - o Feb. 4, 2009 - press release held on the project and San Francisco Mayor, Mayor Gavin Newsom joined the California Energy Commission, U.S. Environmental Protection Agency (U.S. EPA) and the National Biodiesel Board (NBB) to announce an innovative state and federal grant-funded biofuel project by the San Francisco Public Utilities Commission (SFPUC)
- July 2009 - sole source waiver signed with Fry-O-Diesel
- August 24, 2009 - reached agreement with Pacific Biodiesel to provide Brown Grease Recovery equipment (RSI insisted on a non-disclosure agreement that SFPUC attorneys could not accept)
- August 2009 - January 2010 - equipment fabrication and installation
- January 2010 - November 2010 - WWTP plant integration issues - including site modification
- November 2010 - start-up of Brown Grease Recovery Facility
- December 2010 - start Demonstration Period - Biodiesel Facility still not functioning

As can be seen from the timeline above, there were significant delays due to the change from M&E, the steps the City of San Francisco had to take to accept the grant, the withdrawal of the original project partners, significant time to choose new equipment providers including developing contracting vehicles to purchase the equipment, significant time to install two new facilities at the existing WWTP and issues regarding integration into the plant processes. The City's contracting process is arduous under ideal conditions and it is often very difficult to specify a sole source, which was required for this project. In addition, both equipment providers had and continue to have concerns about the City's "sunshine ordinance" and possibility that their trade secrets might be revealed. This issue required significant time to resolve, as the City Attorney ruled that SFPUC could not enter into non-disclosure agreements. This

delayed transmittal of key documents, such as Operations manuals, from the contract vendors to the City, thus delaying project development.

SFPUC has had success getting the Brown Grease Recovery Facility operational. After start-up in November, SFPUC has been receiving several trucks a day (exceeding 10,000 gal/day) of trap waste and has improved facility operation and recovery. SFPUC plan to run this facility through the 6-month demonstration period until May 31, 2011. The Biodiesel Facility has been plagued with problems with their ancillary equipment (methanol recovery system) and are currently installing a different technology for methanol recovery. Preliminary results indicate that the core process can effectively process brown grease into ASTM-standard biodiesel, however, sustained operation is required to meet the terms of the grant and determine the economic viability of this process.

SFPUC is asking for a no-cost extension in order to run both facilities at least until May 31, 2011 and complete final reports by September 30, 2011. Without this extension, the significant expense and effort would have been wasted because only limited conclusions can be drawn at this time.

Proposed Work

The purpose of this project is to demonstrate the beneficial re-use of waste fats, oils, and greases (FOG, a.k.a. "brown grease" or "trap grease") from restaurant grease trap waste and produce biodiesel as transportation fuel. If successful, this project will demonstrate the technical and economic feasibility of using waste FOG as a lower-cost feedstock to produce biodiesel fuel.

The project team, led by SFPUC, and including URS Corporation, Pacific Biodiesel Technologies and BlackGold Biofuels, believes that this technology will help reduce the overall cost of biodiesel, add to the diversity of raw materials used for its production, reduce emissions of greenhouse gases related to the disposal of food waste, and reduce the number of sanitary sewer overflows due to grease-related blockages. Within the 12-month no cost extension, the project is expected to complete the remaining tasks of the agreement, including the completion of the six-month test program, development of a business case for brown grease re-use, and preparation of a technology transfer and public relations plan, a production-readiness plan and a final report.

Justification and Goals

This project "[will develop, and help bring to market] advanced electricity technologies that reduce or eliminate consumption of water or other finite resources, increase use of renewable energy resources, or improve transmission or distribution of electricity generated from renewable energy resources" (Public Resources Code 25620.1.(b)(4)), (Chapter 512, Statutes of 2006)).

This project also addresses and will help meet the goals from the Governor's Executive Order S-06-06, the Bioenergy Action Plan, and AB 32 (Nunez & Pavley, 2006), a landmark bill that establishes a first-in-the-world comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases. The Executive Order sets goals for the state to produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. In addition, this project will support the 2005 Integrated Energy Policy Report (IEPR) which

realizes the strategic value of biomass and alternative transportation fuels, the Governor's response to 2003-2004 IEPR, the Governor's Ten Point Electricity Plan the Energy Action Plan II, and the Western Governor's Association's goal for a clean and diversified energy supply.

This will be accomplished by:

- Developing a process and technology to convert waste FOG to a high quality brown grease feedstock containing less than 2% moisture, insolubles, and unsaponifiables (MIU).
- Demonstrating that brown grease feedstock can be used as a biofuel by conversion to a biodiesel product.
- Demonstrating that the biodiesel product can be blended to meet American Society for Testing and Materials (ASTM) standards and California Air Resources Board (CARB) requirements for biodiesel.
- Introducing and making a market-ready standardized package brown grease recovery/ and biodiesel production plant.