

MONTHLY PROGRAM REPORT

SEPTEMBER 2003

COMMONWEALTH BIOGAS/PV MINI-GRID RENEWABLE RESOURCES
RD & D PROGRAM

*Making Renewables Part of an Affordable and Diverse
Electric System in California*

CONTRACT NO. 500-00-036

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

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PLANNED ACCOMPLISHMENTS FOR THIS PERIOD:

Project 0: Program Administration

Itron anticipated that the focus of activity in September would involve the preparation and follow-up for the first Critical Program Review (CPR) meeting to be held on September 24th. Itron and the CE Team will work closely with the Commission to finalize the meeting agenda, submit meeting invitations to the RPAC members, and prepare a meeting presentation. Additionally, it was anticipated that numerous project draft and final reports would be submitted for Commission review at least 10 days prior to the CPR meeting. Each of these Program deliverables was to be placed on the private side of the CE PIER Program website.

Schedule revisions and/or potential task level budget reallocations under Exhibit B of the contract will be finalized and presented to the Commission for approval.

Project Monthly Status Reports will be drafted for Projects 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3 for the month of July, and reviewed internally prior to submittal to the Commission and posting on the CE Program Website.

Project 1.1: Program Planning and Analysis

Activity in September was to focus on completing a number of draft and final reports, which needed to be submitted prior to the Critical Program Review meeting scheduled for September 24. It was anticipated that the CE Team would submit the Task 1.1.7, Task 1.1.8, Task 1.1.9b and Task 1.1.10 draft reports for review and comments to the Commission and TAC Members.

Additionally, CH₂ anticipated that their response to the Commission's comments on the Task 1.1.2 Draft *Agricultural Inventory Report* would be completed and ready for re-submittal to the Commission.

Finally, the CE Team anticipated that work on the Draft Final Report for Project 1.1 under Task 1.1.11b would re-start in response to comments from RPAC members and Commission Staff following the September 24th Critical Program Review Meeting.

Project 2.1: Enhanced Landfill Gas Production

Primary focus was to be placed on responding to questions and issues raised at the Mid-Valley bioreactor project meeting held in late August. CH₂ and the CE Team also anticipated preparing for the Project 2.1 TAC meeting to be held on September 10th, as well as for the Critical Program Review Meeting with the RPAC on September 24th. It was also anticipated that the completion of the Task 2.1.1 *Waste Characterization Report* would be finalized, incorporating comments received from the Commission and TAC members.

Project 2.2: Enhanced Energy Recovery through Optimization of Anaerobic Digestion and Microturbines

The emphasis of activity would continue to be data collection and analysis in relation to process selection. CH₂ anticipated that the draft *Process Selection Report* would be completed and forwarded to the Commission and TAC members for review. A brief Project 2.2 status presentation was to be prepared for the September 24th Critical Program Review meeting with the RPAC.

Project 3.1: Dairy Waste to Energy

Comments received from the Commission and Mr. Kurt Roos on the Draft *Digester Comparison Report*, were to be addressed and integrated into the report by the Project Team. Several information requests submitted in August were also expected to be received in September.

Additionally, CH₂ anticipated completing and submitting the Draft *Test Plans and Protocols Report* to the Commission for review. A brief Project 3.1 status presentation was to be prepared for the September 24th Critical Program Review meeting with the RPAC.

Project 3.2: Building-Integrated PV (BI-PV) Testing and Evaluation Project

Endecon anticipated completing the installation of the remaining PV-arrays as well as the electrical conduit for the *Large Systems Testing* effort. Additionally, it was anticipated that the installation of the metering and a significant portion of the data acquisition equipment was to be prepared in order to interconnect with the Southern California Edison system. Additionally, a brief Project 3.2 status presentation was to be prepared for the September 24th Critical Program Review meeting with the RPAC.

Project 3.3: Building-Integrated PV (BI-PV) on Public Facilities

REDI anticipated receiving the final comments from the Commission staff on the Task 3.3.2 draft *Evaluation Tools Package*, and was to begin responding to these comments upon receipt. Additionally REDI was to prepare a brief Project 3.3 status presentation for the September 24th Critical Program Review meeting with the RPAC.

WHAT WAS ACCOMPLISHED THIS PERIOD:

Project 0: Program Administration

As anticipated, project-specific administration support under Task 0.8 continued. Revisions and/or potential budget reallocations were refined, and submitted to the Commission for review, comments or approval.

The Commonwealth Program Director worked with Commission staff and CE Team members, refining the CPR Agenda, and preparing the Presentation materials for Commonwealth's first Critical Program Review Meeting held on September 24th at the California Energy Commission, Hearing Room B.

Project Monthly Status Reports were drafted for Projects 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3 for the months of July and August were drafted and submitted internally for review. These reports were then forwarded to the Commission for review and approval, and were subsequently placed on the Commonwealth PIER Mini-grid RD&D Program Website.

Project 1.1: Program Planning and Analysis

As anticipated, Task 1.1.8, Task 1.1.9b and Task 1.1.10 draft final reports were submitted to the Project 1.1 Technical Advisory Committee (TAC), and the Commission a minimum of 10 working days prior to the September 24th CPR meeting. Additionally, Task 1.1.7 was

submitted to the Project TAC for review as well. All of these Program deliverables were placed on the private side of the CE PIER Program Website.

CH₂ continued the collection of information in response to Commission comments on the Agricultural Facilities Database and Inventory Report, under Task 1.1.2, and final revisions were being completed in late September.

Work continued on the Project 1.1 Final Report under Task 1.1.11b, and the CE Team anticipates submitting a draft internally and to the Commission staff in late November or early December.

Project 2.1: Enhanced Landfill Gas Production Using Bioreactors

Activities were undertaken in support of the preparation of the *Conceptual Design Report* as well as continued work with the host, San Bernardino County. Additionally, information was reviewed in regard to the San Timoteo landfill.

As anticipated, there were two meetings held in September: The Technical Advisory Committee (TAC) meeting on September 10th, and the first Critical Program Review (CPR) meeting held on September 24th. As a result of the August 28th meeting, the CE Team assembled information regarding the project schedule and its importance in evaluating options for developing the bioreactor. Additionally, the CE team continued its collaboration with the landfill operator and the County's design engineer, regarding the issues that were raised at the Mid-Valley site.

Documents that outlined the bioreactor's conceptual design were prepared and distributed at the August 28th meeting. Although the layouts were specifically designed for the Mid-Valley site, they could be applicable to other locations as well. Primary results were presented at the CPR meeting on September 24th, with a key point made that there were two options for the direction of this task; 1) continue to focus on two smaller research-scale bioreactors, one with an amendment, and one without; or 2) focus on a larger scale project which would highlight an advancement in implementing a bioreactor in a relatively large commercial landfill.

Project 2.2: Enhanced Energy Recovery through Optimization of Anaerobic Digestion and Microturbines

As anticipated, the draft Selection Report was submitted on September 12th to Commission staff for review.

Several meeting and teleconferences took place between the CE team and the proposed project hosts, and a meeting was held to review the ultrasound work with the Riverside Treatment Plant staff.

The topics addressed within the *Process Selection Report* were also submitted at the first Critical Program Review meeting on September 24th. The key result to-date is the recommendation that future efforts within this project focus on ultrasound. It has been concluded that the ultrasound field is rapidly advancing, and that there are a number of vendors with new technologies worthy of testing. Additionally, ultrasound is more likely to be implemented at other locations in California than is thermal hydrolysis.

Project 3.1: Dairy Waste to Energy

The primary focus in September continued to be the response to comments received on the draft *Digester Comparison Report*. Changes were made to the draft report in relation to the comments received from Commission staff, and work began on responding to Mr. Roos' comments. Technology reviews continued, utilizing information provided from NIRAS as well as other vendors involved in manure digestion.

CH₂ prepared a brief presentation for the CPR meeting on September 24th. The merit of evaluating dairy facilities and the technologies that could be used to make them more efficient and economic was highlighted at the meeting. During the CPR meeting and at a meeting held with Commission staff directly following the CPR meeting, it was determined that it would be more appropriate to test technologies at a complete mix digester more typical of those that exist elsewhere in California. As a result, all work related to RP-5 has ended (except for monitoring and related analysis of comparative performance of digesters) and it was determined that future testing would only occur at RP-1.

Work continues on the protocols for testing different processes at existing dairy clusters. Test plans were compiled into a report, allowing reviewers to assess technologies and their potential benefits to centralized dairy facilities. The draft report was completed and submitted to Commission staff for review on September 5th.

Project 3.2: Building- Integrated PV (BI-PV) Testing and Evaluation Project

As anticipated, Endecon completed the final 4 kW of PV arrays of the 60 kW of PV systems, as significant progress was made on the terminations for switches and inverters. As of September, close to 80% of the electrical has been completed, with the remaining work to be completed in October. Additionally, all 12 ac power meters were installed and their pulse outputs connected to the data logger.

Work continued to focus on the large system installation, and no significant progress on the small systems testing was made during September.

Project 3.3: Building-Integrated PV (BI-PV) on Public Facilities

As anticipated, REDI submitted the revised draft *Evaluation Tools Package* to the Commission for review. Comments were received from the Commission immediately following the CPR meeting on September 24th with the RPAC. Per a request from the Commission, REDI has forwarded the deliverable to a former Commission staff employee for their review and input on the package.

Work under Task 3.3.4a, *Select Demonstration Project Sites*, continues to await final approval of the Software Evaluation Tool Package, as this product will be used in its final form for site/project assessment under Task 3.3.4a. REDI continues to work with Commonwealth and other investors on ESP funding, as well as assisting BI-PV clients with system designs and bid solicitation.

HOW WE ARE DOING COMPARED TO PLAN:

Of the active projects, Project 1.1, Project 2.1, Project 3.1, Project 3.2 and Project 3.3 have some task elements that are running behind our Program schedule. However, the majority of the Project Tasks being implemented are proceeding along schedule. The following discussion summarizes the delays that have been encountered to date. Note that these individual task delays may impact the individual Project's targeted completion dates.

- **Project 1.1:** Although the CE Team has experienced challenges in gathering certain data, completing responses to comments, which has in some instances, delayed the completion of reports that were in turn crucial to the completion of another task, the majority of these issues have been resolved.
- **Project 2.1:** As reported previously, an important challenge has been gaining regulatory acceptance of the bioreactor landfill project. The CE Team will continue to closely follow and facilitate/monitor this process. Additionally, primary data was not available to the CE Team in electronic format.
- **Project 2.2:** Although this project is on track, there remains uncertainty regarding the project, which will be recommended for funding, and this uncertainty may cause a slight delay in the deliverable date for the *Process Selection Report*.
- **Project 3.1:** This project has experienced a slight delay in the submittal of the *Technical Memorandum Comparing Plug Flow and Complete Mix Digestion* due to the unanticipated length of time required to assemble cost information on the RP-5 plug flow project, in a manner which would allow it to be compared to other digester projects. Additionally, as the *Test Plan and Protocols Report* builds on the results from the aforementioned *Digester Comparison Report*, there was a lag time between report submittals.
- **Project 3.2:** Task 3.2.2 (1) activity has previously been delayed due to negotiations and related contract approvals in relation to the Commonwealth-IEUA Power Purchase agreement, as well as approval of the purchase orders for

the Large Systems. This delay has had a trickle down effect on subsequent tasks within this Project.

- **Project 3.3:** Task 3.3.2 has taken longer than originally anticipated to complete, due to multiple outside technical reviews. The draft deliverable, although essentially completed, continues to be in an evaluation phase. Additionally, the delays in the *Large Systems Testing* task under Project 3.2, has also affected the schedule for Task 3.3.4.

SIGNIFICANT PROBLEMS OR CHANGES:

As indicated above, many of the Projects have work elements, which are currently behind schedule. Some of these task delays are likely to impact overall Project completion dates, and as reported, a revised schedule (Contract Exhibit B) was submitted to the Commission for review and approval in September, addressing any necessary changes in schedule for these projects. However, note that current Program progress and expenditures should result in the Program being completed on time and within budget.

EXPECTED ACCOMPLISHMENTS DURING THE NEXT PERIOD:

Project 0: Program Administration

Iron anticipates submitting the Minutes from the September 24th *Critical Program Review Meeting* to the CE Team internally, and then to the Commission staff for review. Upon receiving Commission approval, the Minutes will be placed on the CE Program Website, along with the Agenda and Presentation for this meeting.

Project Monthly Status reports will be drafted for Projects 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3, as well as a Program Status Report for the month of September, and reviewed internally prior to submittal to the Commission and posting on the CE Program Website.

Additionally, the CE Team anticipates submitting CE Program Invoice # 7.

Project 1.1: Program Planning and Analysis

Primary activity in October will focus on follow-up from the September 24th CPR meeting, and response to comments received from the Task deliverables submitted in early September. The CE Team anticipates that the Task 1.1.2 final report will be submitted to the Commission for final review and approval. Additionally, work will continue on Task 1.1.11, *Project 1.1. Final Report*, and the Task 1.1.13 M&E Plans will be drafted.

Project 2.1: Enhanced Landfill Gas Production

The primary focus of activity will be the continuing response to issues raised at the August 28th and September 10th meetings. The CE Team will also consider the guidance received at the September 24th CPR meeting with the RPAC in regard to focusing on one bioreactor.

A follow-up meeting is planned for October with San Bernardino County, Burtech, Regional Water Quality Control Board, and the County's design engineer. The goal will be to reach consensus on the location of the bioreactor in order to meet the overall Program's objectives within the appropriate schedule.

Additionally, CH₂ anticipates completing the *Waste Characterization Report* and submitting it as a final deliverable.

Project 2.2: Enhanced Energy Recovery through Optimization of Anaerobic Digestion and Microturbines

Information collection and associated analysis activities will continue in October in relation to the implementation of the technologies identified within the *Process Selection Report*. Activity will also continue as related to enhanced energy production, and activity with the project hosts, IEUA and Riverside County, will also continue.

Project 3.1: Dairy Waste to Energy

The primary focus of activity will be in responding to comments received at the September 24th CPR and the follow-up meeting later that day with Commission staff. CH₂ will place emphasis on the preparation of a plan to implement this project based upon the comments received.

Additionally, the CE team will finalize previously submitted draft reports, including the *Digester Comparison Report*, and will submit as final deliverables. The information that the CE Team had anticipated receiving in September was not received. However, the CE Team will utilize the information received to date and incorporate any additional data, which may be received in October.

CH₂ also anticipates that the *Test Plans and Protocols Report* will be revised to focus on planned project activities in locations other than RP-5.

Project 3.2: Building-Integrated PV (BI-PV) Testing and Evaluation Project

Endecon anticipates completing the installation and performing the initial testing of all 12 individual components of the Large Systems. Additionally, Endecon anticipates finalizing the data acquisition system and the installation of the pyranometers and thermocouples.

A paper will be presented at two conferences, providing an overview of the project work and on the developing the BI-PV industry.

Project 3.3: Building-Integrated PV (BI-PV) on Public Facilities

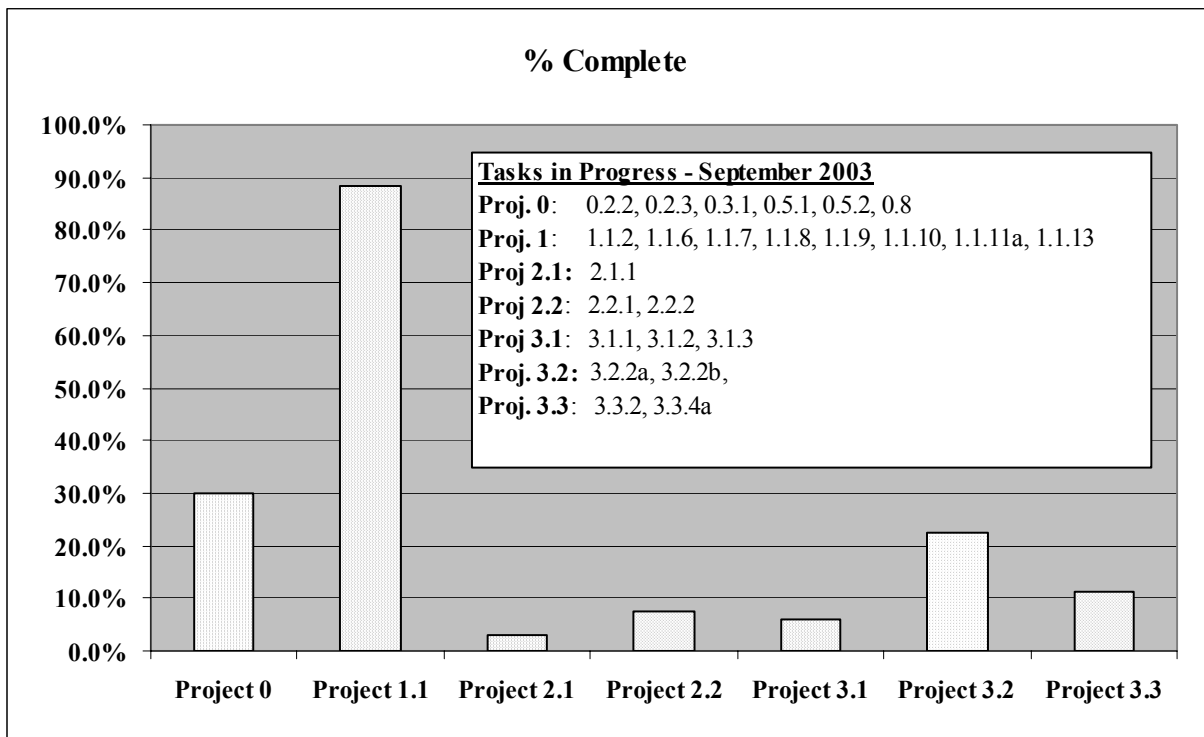
REDI will continue to respond to comments received from the Commission on the *Evaluation Tools Package*. An independent review with a former Commission staff member is in-process and REDI anticipates reviewing and (if applicable) incorporating comments into the deliverable.

Upon approval of the *Evaluation Tools Package*, REDI will then complete its review all of the Public Sector BI-PV demonstration sites and will generate a report for internal review. REDI will continue to work with representatives of the Demonstration project sites as well as Commonwealth Energy and other ESP funding representatives.

OVERVIEW OF PROGRAM STATUS:

Figure 1 below summarizes the overall Commonwealth Program status for each project and identifies the active tasks as of the end of the current reporting period.

Figure 1: Summary of Program and Project/Task Status



OVERVIEW OF PROGRAM FISCAL STATUS:

Table 1 and Figure 2 below summarize the fiscal status of the Commonwealth Program by Project as of the end of the current reporting period.

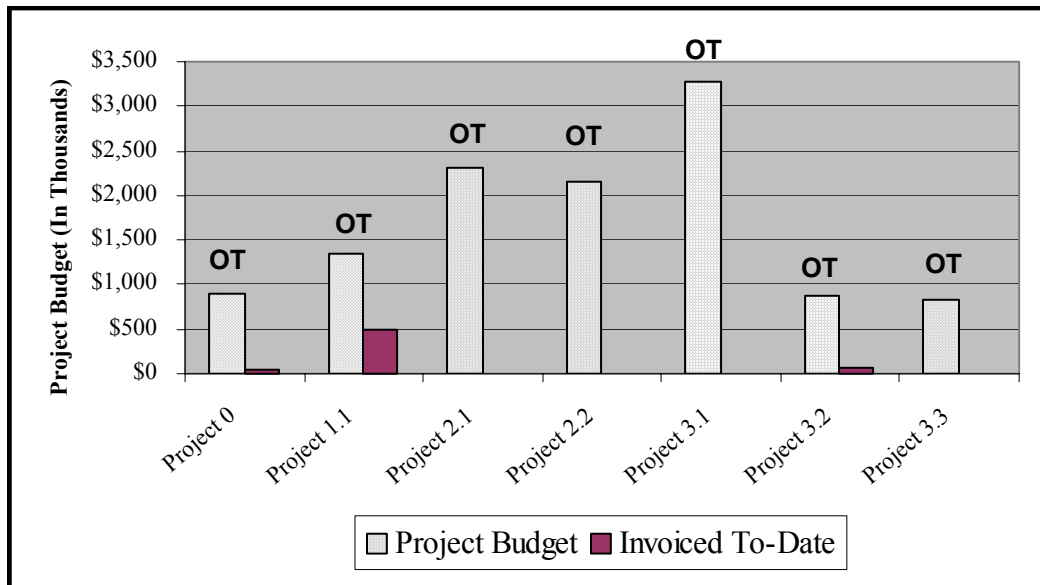
Table 1: Cumulative Program Fiscal Status By Project

| Project Number | Project Budget | Invoiced To-Date (\$) | Fiscal Status * |
|----------------|----------------|-----------------------|-----------------|
| Project 0 | \$ 889,771 | \$43,375 ** | OT |
| Project 1.1 | \$1,336,613 | \$504,508** | OT |
| Project 2.1 | \$2,315,999 | 0 | OT |
| Project 2.2 | \$2,153,740 | 0 | OT |
| Project 3.1 | \$3,274,664 | 0 | OT |
| Project 3.2 | \$ 870,099 | \$76,014** | OT |
| Project 3.3 | \$ 827,686 | \$9,000** | OT |

*Fiscal Status = (OT) "On Track", (OB) "OverBudget", (UB) "UnderBudget"

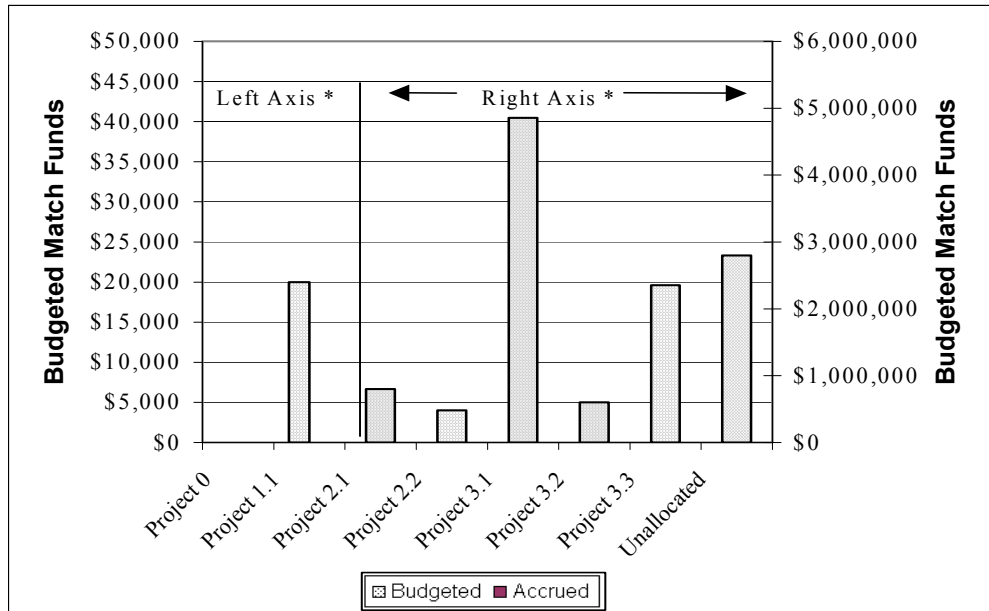
** Invoice Amount Shown after 10% retention withheld.

Figure 2: Program Fiscal Status - PIER Expenditures



*Fiscal Status = (OT) "On Track", (OB) "OverBudget", (UB) "UnderBudget"

Figure 3: Program Fiscal Status - Match Funds



* The Budgeted Match Funds for Project 1.1 are significantly lower than Projects 2.1 through Project 3.3, therefore, we have utilized a left and right axis with differing value levels, which allows us to better highlight the Project Match Funds.