

MONTHLY PROGRAM REPORT

FEBRUARY 2004

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

Contractor Project Director: Patrick Lilly 360-906-0616
Commission Project Manager: Zhiqin Zhang 916-654-4063

Program Team Members: Commonwealth Energy Corporation (Commonwealth), Itron/Regional Economic Research (Itron/RER), CH₂MHill (CH₂), Endecon Engineering (Endecon), Renewable Energy Development Institute (REDI), Zaininger Engineering (ZECO).

PLANNED ACCOMPLISHMENTS FOR THIS PERIOD:

Project 0: Program Administration

The Commonwealth Program Director planned to continue to provide on-going support to the CE Team and Commission staff, as the potential project or task-level redirection/revisions continue under Projects 2.1, and 3.1 that may impact project schedules, budgets and/or deliverables.

Project Monthly Status reports were to be drafted for all Projects (#s 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3) as well as a *Program Status* report for the month of January, and reviewed internally prior to being submitted to the Commission and posting on the Commonwealth PIER Mini-grid RD&D Program Website.

Project 1.1: Program Planning and Analysis

The CE Team planned to continue to prioritize projects, and integrate the Commonwealth Business Plan into the prioritization process. Additionally, Itron anticipated that comments on the Task 1.1.8 final report would be received from the Commission, and those comments would be incorporated into the final deliverable. Integration of approved task deliverable

results were to continue to be incorporated into the *Project 1.1. Final Report* under Task 1.1.11.

Project 2.1: Enhanced Landfill Gas Production

In February, the focus was to remain on the continued collaboration with the San Bernardino County's engineer in relation to design concept issues at the bioreactor projects. The team planned to continue its preparation of technical information, which was to be included in the *Conceptual Design Report*, as well as the construction and test plans.

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

Information collection and analysis activities were to continue in relation to the implementation of the technologies identified in the *Process Selection Report*. CH₂ planned to focus on finalizing the *Site Selection and Test Plan* report, with significant emphasis placed on coordination with the vendors in order to ensure that the six-month testing period can begin in a timely manner. Additionally, further refinements were expected on the *Memorandum of Understanding (MOU)*.

Project 3.1: Dairy Waste to Energy

The focus to re-evaluate the project in light of the Commonwealth Business Plan was to continue, and the proposed project prioritization decision-making framework was to be undertaken. Once this information had been developed, it would be incorporated into the *Implementation Plan* in order to develop a focus for future program activities. Additionally, CH₂ anticipated continuing to finalize the *Test Plan and Protocol* and *Digester Comparison Reports*, and working with Commonwealth Energy to link these projects with the CE Business Plan.

Preparation for the February 5th *Environmental Benefits Peer Review Team* workshop would continue. It was anticipated that the Peer Review Team would provide input on the baseline analysis as well as the expanded annotated outline for the *Monitoring, Reporting and Verification* protocol.

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

Endecon anticipated finalizing the interconnection agreement, in order to proceed with the start-up of the large system. Additionally, it was expected that the inverters would be shipped for testing.

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

REDI anticipated receiving approval of the *Evaluation Tools Package (ETP)* deliverable. Once received, REDI planned to review the Public BI-PV Demonstration sites, and a report

would be drafted. Additionally, REDI was to continue its work with the 10 Public Sector site representatives, developing projects specifications and documentation as needed.

WHAT WAS ACCOMPLISHED THIS PERIOD:

Project 0: Program Administration

As anticipated, *Project Monthly Status* reports were drafted for all Projects (#s 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3), as well as a *Program Status* report for the month of January, and reviewed internally.

The Commonwealth Program Director continued to hold teleconference meetings and met with Commission staff and CE Team members, to review and discuss potential redirection/revisions to Project work plans/scope/focus for Project 2.1, 2.2 and 3.1. The Commonwealth Program Director traveled to San Diego on February 11th to meet with CE Team members to review ongoing work on Project 0 and Project 1.1, and to review the CE Business Plan, in relation to current projects and overall PIER program linkages.

Additionally, the Commonwealth Contract Administrator provided support to the CE Team on various pending project deliverables, as well as preparation for Contract Invoice # 8.

Project 1.1: Program Planning and Analysis

Itron continued to make revisions to the Task 1.1.8 report, incorporating the generation profiles from the anticipated CE Program RD&D generation, as well as the fully realized mini-grid. Work also continued on the Task 1.1.10 report, with the primary focus of activity in February placed on the initial draft of the prioritization framework, as well as the development of the decision-making model, which will consider a variety of factors in the prioritization of projects to be implemented under this program. The drafted model includes a mechanism, which weighs differing attributes based upon their importance to the technical benefits and objectives of the PIER program, the CE Business Plan, and the Mini-Grid. Initial weights were established and will be utilized to provide preliminary results.

The CE Team continued to integrate approved project key results into the draft Project 1.1 Final Report, under Task 1.1.11b. As with the *Project Prioritization Report*, this deliverable awaits the completion of the revised project prioritization effort under Task 1.1.10, the finalized Commonwealth Business Plan and a revised Project 3.1 *Implementation Plan*, prior to being finalized for submission.

Project 2.1: Enhanced Landfill Gas Production Using Bioreactors

Activities continued on Task 2.1.3, the *Conceptual Design for the First Bioreactor*. Consultations and coordination with BAS and the CE Team are ongoing as we continue to draft detailed plans for developing the bioreactor at Mid-Valley. In February, BAS began

completing elements of the conceptual design as well as the construction and test plans, which will link the bioreactor project with the ongoing design project at the site. During February, the design effort was expanded to develop further information consistent with the need for a design suitable for the public bidding process. Further, Commonwealth initiated an additional \$20,000 in matching fund activity to develop an engineering and economic evaluation to ensure PIER program integration with CE business planning activity. Additionally, the CE Team continued to implement the first phase of the approach to be undertaken, focusing on environmental permitting and design activities, which will link the PIER bioreactor project to the County's ongoing program.

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

CH₂ continued to follow-up on the Draft *Process Selection Report* submitted previously, with emphasis placed on the review and analysis of the presented technologies. Discussions continue with the technology vendors and County staff in order to ensure that appropriate and efficient plans are under way, which will allow a smooth transition from process selection through installation. Further coordination between Riverside County and the CE Team was undertaken regarding the *Memorandum of Understanding (MOU)*, as it relates to the implementation at their facility.

The CE Team and technology vendors, continued to apply information from the *Process Selection* phase, into the *Site Selection and Test Plan* development activities. A draft of this report was completed in January, and further refined in February. Additionally, detailed planning continued with the technology vendors, and a schedule was developed to provide them with a workable plan for the completion of the development of the test units in the appropriate/necessary timeframe.

Project 3.1: Dairy Waste to Energy

The CE Team continued to work on the Project 3.1 *Implementation Plan*. Ongoing revisions are being integrated into the plan, as the CE Team continues to assemble compiled results, which could be applied to future centralized projects. Work also continues on the integration of these potential projects into Commonwealth's Business Plan.

In February, work on the *Test Plans and Protocols Report* continued to be limited to incorporating the Commission's comments, and outlining the linkage to the Commonwealth Business Plan. Finalization of this report is expected upon receipt of comments, as well as finalization and approval of the *Project 3.1 Implementation Plan*.

As reported previously, CH₂ received approval from the Commission to initiate work on Task 3.1.6, *Conduct Economic and Environmental Assessment*. Work continued with the team building upon information obtained from the December site visits, as well as

subsequent analysis completed in January. As anticipated, an expanded annotated outline of the *Monitoring, Reporting and Verification* protocol was prepared in order to quantify environmental benefits associated with centralized digestion projects.

As anticipated, on February 5th the CE Team conducted a workshop on the environmental issues associated with centralized anaerobic digestion projects. This meeting was held in Sacramento and included approximately 30 individuals, with over 2/3 participating in person. During the workshop, the December field activity was reviewed, and considerable interest was shown on the work being conducted. Additionally, the results of the February 5th workshop will be utilized for the Task 3.1.6 report, to further develop investigations into air and water quality, renewable energy and greenhouse gas components of the analysis. The CE Team anticipates that the draft report will be ready for Commission and Peer Team review in April.

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

In February, Endecon received approval on the interconnection agreement application, which was submitted in January, for the whole large system. With this approval, the system is scheduled to start up on March 1, 2004.

Progress was made on several agreements, with RWE Schott and Kyocera for the loan of systems for the evaluation, and with NUON on the Davis PVUSA site. Additionally, the Sharp inverter was shipped for characterization.

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

As anticipated, the *Evaluation Tools Package (ETP)* was submitted to the Commission for final review in January, and is currently being reviewed. Project work under Task 3.3.4a, *Select Demonstration Project Sites*, continues to await final approval of the *ETP*, as this product will be used in its final form for site/project assessment under Task 3.3.4a.

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 original Program schedule. However, the majority of the Project Tasks being implemented are proceeding along the (09/17/03) revised Exhibit B 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 continues to closely follow and facilitate/monitor this process. Additionally, a delay in receiving primary data, affected the completion of the Task 2.1.1.a report.
- **Project 2.2:** Although this project is on track, due to project redirection and specifically a change of focus to the RP-1 site, additional coordination activities have been required with the technology vendors. This redirection will improve the implementation of the pilot programs, but has delayed the completion of the Site Selection and design tasks.
- **Project 3.1:** As the *Test Plan and Protocols Report* builds on the results from the aforementioned *Digester Comparison Report*, there has been a lag time between report submittals. These reports will be revised based upon the approved Project 3.1 Implementation Plan, prior to final submittal.
- **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 and the SGIP Incentives reservation request to SCE for the 60 kW Large Systems. This delay has had a trickle down effect on subsequent tasks within this Project. Additionally, a problem with the PowerLight Array has caused a slight delay, but was resolved in January.
- **Project 3.3:** Task 3.3.2 has continued to take much longer than anticipated to complete, due to multiple outside technical reviews and related revisions implemented to the BI-PV *ETP*. The final draft deliverable has been revised and resubmitted to the Commission. 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 may impact overall Project completion dates, and as reported, a revised program schedule (i.e., contract Exhibit B) was submitted to the Commission for review and approval, which addressed schedule and task-level budget changes for these projects and their tasks. However, note that current Program progress and expenditures should result in the Program being completed on time under this revised schedule and within the Program's budget.

EXPECTED ACCOMPLISHMENTS DURING THE NEXT PERIOD:

Project 0: Program Administration

It is anticipated that the Commonwealth Program Director will continue to provide ongoing support to the CE Team and Commission staff. Additionally, work will continue on the PIER Program 1st Annual Report. It is anticipated that a draft of the report will be reviewed internally in early April and be ready for submittal to the Commission thereafter. *Project Monthly Status* reports will be drafted for all Projects (#s 1.1, 2.1, 3.1, 3.2 and 3.3) as well as a *Program Status* report for the month of February, and reviewed internally prior to submittal to the Commission and posting on the Commonwealth PIER Mini-Grid RD&D Program Website.

The Contract Administrator will continue to provide support to the CE Team as project deliverables are presented for internal and TAC review prior to submittal to the Commission. Additionally, it is anticipated that Contract Invoice #8 will be drafted in late March.

Project 1.1: Program Planning and Analysis

Efforts will continue on the prioritization process as projects are identified within the inventory process. It is anticipated that preliminary conclusions will be presented to the Commission prior to the finalization of the prioritization effort.

Itron anticipates incorporating final revisions into the Task 1.1.8 report, and submitting it for final review and approval to the Commission, in late March.

Upon receiving feedback from the Task 1.1.10 prioritization effort, as well as key results from the approved Task 1.1.8 final report, the CE Team will integrate these results and findings into the Project 1.1. Final Report, under Task 1.1.11b.

Project 2.1: Enhanced Landfill Gas Production

In March, the CE Team plans to finalize the conceptual design and construction and test plans for the bioreactor site at Mid-Valley. Ongoing collaboration between BAS and the CE Team will continue as the conceptual design is integrated with the ongoing design at the site. The team anticipates that a draft *Conceptual Design Report* will be ready for internal circulation and review. Additionally, discussions will continue on the draft *Memorandum of Understanding (MOU)*, with anticipation that it will be finalized by the end of March.

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

Team efforts will continue to be focused on the integration of two ultrasound systems into the Riverside Plant and integrating H₂S and siloxane removal systems into the RP-1 site. The

final results of these efforts will be presented in the *Site Selection and Test Plan* report, anticipated to be submitted in mid-March.

Project 3.1: Dairy Waste to Energy

Activity will continue to be focused on efforts to re-evaluate the project in light of Commonwealth's Business Plan. Additionally, the proposed project prioritization decision-making framework will continue to be developed. It is anticipated that a meeting will be held in March with the CE Team and Commission staff to review the future direction of Project 3.1 in light of Commonwealth's business objectives. Additionally, the results of the February 5th workshop with the *Environmental Benefits Peer Review Team* will be reviewed and analyzed. Based upon input from the meeting, specialists in air and water quality as well as renewable energy, will begin to develop sections of the Task 3.1.6 deliverable.

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

Endecon anticipates that the startup of the large system will have occurred, and they will be receiving data streaming to the web for review. Additionally, two *Initial Characterization Reports* will be drafted and submitted to the Technical Advisory Committee for review and comment. Additionally, agreements will be finalized in order to have all three (3) systems ready for installation at PVUSA.

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

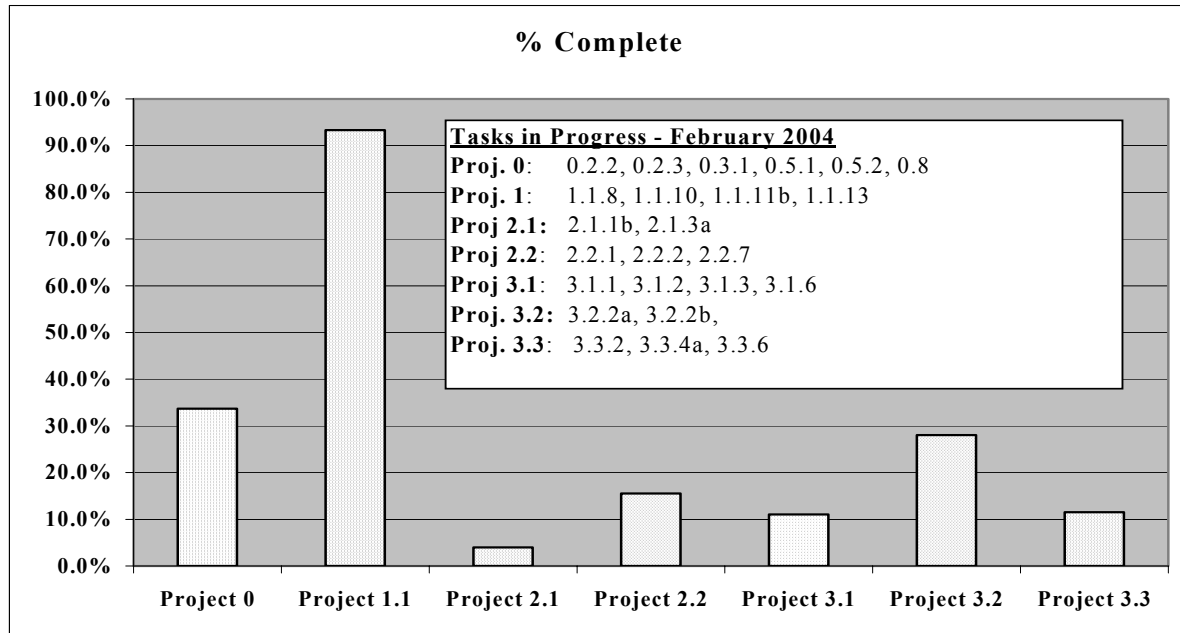
REDI anticipates receiving final approval on the *ETP* deliverable. Upon approval, REDI will review all of the Public Sector BI-PV Demonstration sites and generate a report for internal CE Team review. REDI will also continue to work with the 10 Public Sector BI-PV site representatives while developing specifications and solicitation documents as needed.

Additionally, REDI anticipates continuing its coordination with Commonwealth and other ESP third party financing representatives in order to further develop matching funds for this project.

OVERVIEW OF PROGRAM STATUS:

Figure 1 on the following page 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.

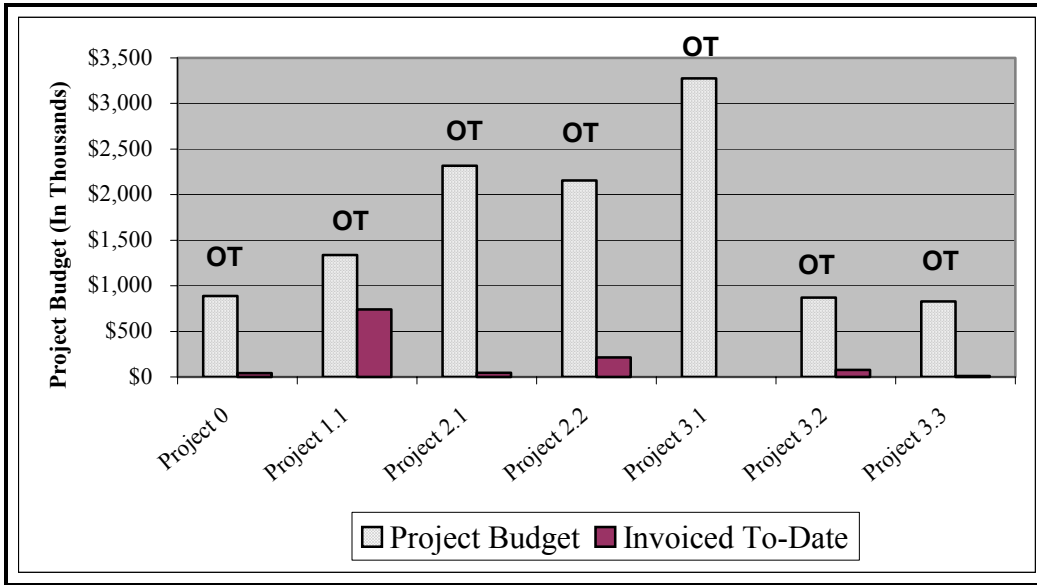
Table 1: Cumulative Program Fiscal Status by Project

Project Number	Project Budget	Invoiced To-Date (\$)	Fiscal Status *
Project 0	\$ 889,771	\$43,375 **	OT
Project 1.1	\$1,336,613	\$741,926 *	OT
Project 2.1	\$2,315,999	\$46,905 **	OT
Project 2.2	\$2,153,740	\$212,907 **	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"

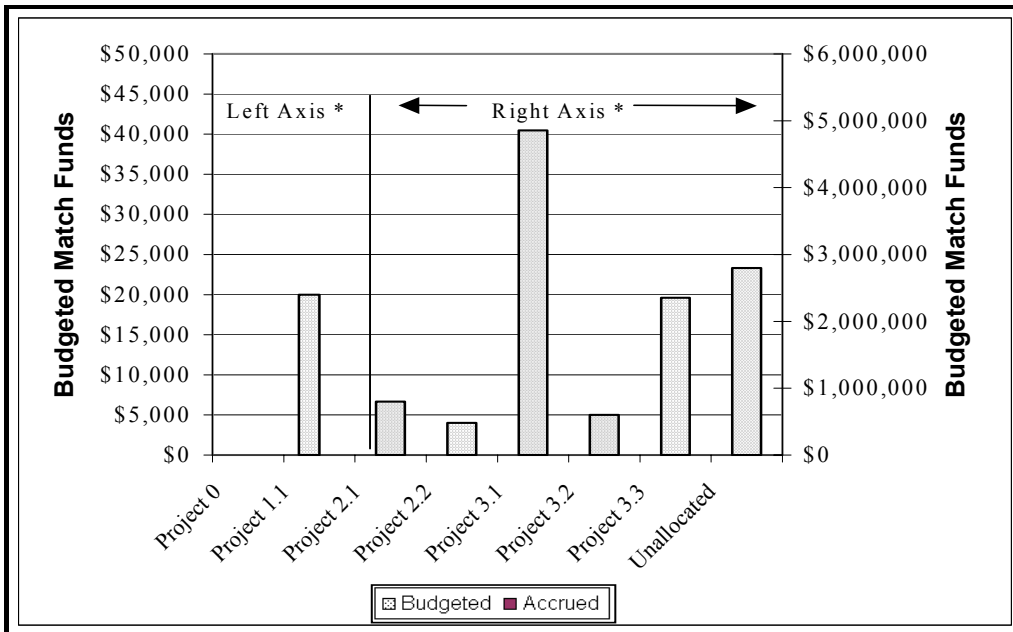
** Invoice Amount Shown after 10% retention withheld.

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.