

MONTHLY PROGRAM REPORT

MAY 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

Project-specific administration support under Task 0.8 was to continue relative to each active Project under the CE Program. Revisions and/or potential budget reallocations were to continue to be reviewed and refined by the CE Program Director. Monthly Status Reports were to be drafted and submitted for approval to the Commission for all projects being implemented under the Program (i.e., Projects 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3). Additionally, a Monthly Program Summary Report was expected to be drafted and submitted for review. In addition, all draft deliverables submitted to the Commission for review will be posted to the Program web site for purposes of internal access and review/comment by RPAC/TAC members and the Commission staff.

It was anticipated that CE Program Invoice # 5 would be drafted and submitted either at the end of May or early June. This invoice was expected to cover Project 1.1, Task 1.1.6 and Task 1.1.9a, as well as Project 3.2, Task 3.2.2a(2).

Project 1.1: Program Planning and Analysis

Program analysis activity was to continue focusing on defining and prioritizing the leading projects to be recommended for PIER Program funding. While awaiting the power flow analysis, the CE Team anticipated identifying and evaluating other prioritization criteria for projects that met other objectives of the Program.

ZECO was to continue the power flow model implementation analysis under Task 1.1.9b. Additionally, it was anticipated that the Task 1.1.6 and Task 1.1.9a Final Reports would be submitted to the Commission and posted to the Program web site.

Itron anticipated completing the preparation of the BI-PV and biogas market potential assessment and draft report under Task 1.1.7. Additionally, Itron anticipated completing the draft final report on generation profiles for Task 1.1.8, which would then be forwarded internally to the CE Team for review prior to being forwarded to the Commission.

Project 2.1: Enhanced Landfill Gas Production

The primary focus of activity was expected to be the development of the waste characterization report for the Mid-Valley landfill in Fontana, San Bernardino County. The CE team was to clarify the research objectives of the Mid-Valley project based upon discussions at the kick-off meeting. Attention will be devoted to ensuring the project builds on the results of the current Yolo County bioreactor project. Additionally, planning activity was to focus on research at one bioreactor site, not two as originally planned.

A final planned activity to be conducted in May was the coordinating of efforts between San Bernardino County staff and project and/or regulatory staff who worked on the Yolo County project.

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

Information collection and analysis was to continue as related to process selection. Additionally, communication with technology developers under consideration would continue, and CH₂ anticipated that the preparation of the draft process selection report would begin in May.

Project 3.1: Dairy Waste to Energy

The primary focus in May was expected to be finalizing the draft technical memorandum comparing the existing digesters at RP-1 and RP-5 to other plug flow and complete-mix digestion projects.

Two important meetings were to be held on April 30th and May 1st. The first meeting was to involve Federal, State and local officials who will be addressing environmental concerns related to digestion projects. The second meeting is a site visit to Langerwerf Dairy, which has been successfully operating for over 20 years.

Other activities in May were expected to include further development of the testing protocols that will implement some of the suggested projects identified in Project 1.1. It was anticipated that the preliminary findings from Project 1.1 may be available in late May, and as such, activities can continue for Project 3.1 according to the current schedule. If the results from the expanded power flow study are not available until later, the Project 3.1 schedule may need to be adjusted accordingly.

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

It was anticipated that the Commonwealth Legal Department would review the large systems task results to date and the pending purchase orders and sign them on behalf of Commonwealth Energy. Additionally, it was anticipated that purchase orders will be issued for two of the three 20kW systems.

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

REDI anticipates that they will submit the draft Evaluation Tools Package to Itron and Commonwealth for review and comments. Once they receive comments, they anticipate incorporating this input, as well as the revisions suggested from the solar industry peer reviewers, with an intended goal of submitting the draft final Evaluation Tools Package to the Commission in June.

Additionally, REDI plans to develop project proposals for 10 identified sites and begin site-specific assessment. They will also continue to work with Commonwealth in developing the ESP funding for Public Sector BI-PV projects.

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 continue to be refined, and the Commonwealth Program Director anticipates submitting the program schedule and budget revisions to the Commission Program Manager for review in June. Project Monthly Status Reports were drafted for Projects 1.1, 2.1, 2.2, 3.1, 3.2 and 3.3 and submitted for internal team review.

Contract Invoice # 5 was drafted to include Project 1.1. - Tasks 1.1.6 and 1.1.9a and Project 3.2 - Task 3.2.2a (2). However, as comments were received later than anticipated for Tasks 1.1.6 and 1.1.9a, the Commonwealth Program Director determined that the Contract invoice

would be submitted in mid-June, once ZECO had presented the revised reports based upon the Commission's comments.

Project 1.1: Program Planning and Analysis

Work progressed on the Task 1.1.2 Inventory Report as CH₂ primarily completed their response to the Commission's comments. As of May, the only remaining component to be addressed was the additional data on the electrical loads at dairies within the Chino Basin. Further discussions and site visits were held with the Milk Producers Council as CH₂ worked toward compiling and integrating this additional information into the Task 1.1.2 report and database.

ZECO responded to the comments that were received from the Commission on both the Data Collection and Development of Chino Basin Mini-Grid T&D Information Final Report under Task 1.1.6 and, the Development of Local Area Mini-Grid T&D Model Final Report under Task 1.1.9a. ZECO submitted the final reports to Itron for internal review, prior to an anticipated submission to the Commission in early June.

ZECO and Itron met to discuss DG installation and load point locations within the Mini-Grid. Additionally, a meeting was held with the Commission to discuss the overall Task 1.1.9 task efforts to-date. ZECO has begun developing year 2007 and 2012 peak and light load power flow cases under Task 1.1.9b addressing low, medium and high expected renewable penetration levels.

Itron continued work on the draft report addressing the economic and market potential results for the biogas and BI-PV resources under Task 1.1.7.

Work continued at a slower pace on the Prioritized List of Projects preliminary working draft report under Task 1.1.10. Based upon the technical work completed to date, CH₂ and Itron determined that the finalization of the list and the report would await the completion of the Mini-Grid Power Flow Analysis, under Task 1.1.9b.

Work continues on the Final Report, with Itron addressing comments received from the Commission on the Task 1.1.11a draft report outline. Additionally, key findings from earlier tasks as well as continued consultation with NIRAS on European technologies continued. Itron anticipates resubmitting the revised Final Report outline to the Commission in June or early July. Finalization of the report will await the Task 1.1.9b Power Flow studies report as well as the Task 1.1.10 Prioritized list of Projects.

Project 2.1: Enhanced Landfill Gas Production Using Bioreactors

The main focus of activity in May was the continued data collection for the preparation of the Waste Characterization Report under Task 2.1.1. Efforts began on the identification of a suitable amendment material for disposal at a bioreactor.

Additionally, CE Team members developed a list of issues to be considered during this project, with the main focus to expand on the work currently being done at the Yolo County Project. A meeting was organized which will take place in June and will be held in Sacramento. This meeting will be conducted along with a site visit to the Yolo County Projects, and will focus on the expedition of the bioreactor design and approval of the development process.

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

Process Selection continued in May with the focus on refining process concepts for enhanced anaerobic design. Discussions continued with Ingersoll-Rand (IR) regarding their new biogas fuel conditioning system and any potential application within this project. A meeting was organized with IR and IEUA staff to explore the IR gas cleaning technology, which could be deployed at one of the IEUA sites. Although work continues on the process selection report, the finalization will await the results from the power flow analysis report.

Project 3.1: Dairy Waste to Energy

The assessment of the different technologies used to attain the energy value of manure continued. Additionally, efforts continued on the protocols used to determine the optimization of biogas production performance at the existing dairy clusters and specifically at IEUA's RP-1 and RP-5 facilities.

The evaluation of *plug flow* and *complete mix* digestion systems, which began in April, continues. Although this analysis was primarily completed, a remaining task is to work with IEUA in order to assemble cost information for the RP-5 project and present the comparison in an "apples to apples" manner. Emphasis will be placed on the economic and environmental analysis of the systems, with the main objective of guiding the Commonwealth Program to the pilot projects that will be most advantageous from a technical, economical and environmental viewpoint.

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

Progress continues on this project, as the Commonwealth CFO has signed the purchase order for the PowerLight 20 kW system. Review of the Schott 20kW system documentation has begun, however the purchase order has not been signed by Commonwealth.

Limited procurement and planning activity continues for the small systems installation. Currently, further work is on hold for the data acquisition system until payment has been received for the Large system DAS.

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

As anticipated, REDI submitted the draft report for the *BI-PV Evaluation Tools* package to Itron for review. REDI received Itron comments and revisions are being incorporated into the package. A meeting was scheduled with two architects to demonstrate the financial spreadsheet and then in turn, to incorporate any comments from this demonstration into the final draft of the tools package.

Work continued on the demonstration project site selection, with on-going discussions with Commonwealth Energy regarding the ESP funding for BI-PV public sector clients. Additionally, new contacts were developed for funding sources.

How we are doing compared to plan:

Of the currently active projects, Project 1.1, Project 2.1, Project 3.2 and Project 3.3 have task components, which are running behind schedule. However, the majority of the Project Tasks are proceeding along schedule. Following are the delays that have been encountered. It is important to note, that these delays, should not significantly impact the overall individual Project's targeted completion dates.

- **Project 0:** Itron has experienced delays in presenting the Project Monthly Status and Program Monthly Progress Reports. It is anticipated that by August, the submitted reports will be up-to-date and current.
- **Project 1.1:** The CE Team continues to experience difficulties in the gathering of dairy site specific data, which has delayed the completion of the Agricultural Facilities Database and Inventory Report. Additionally, Itron has continued to experience delays in the development of some of the biogas project prototypes. This has delayed the completion of the Mini-Grid Market Potential Assessment Report. ZECO experienced delays in receiving and addressing comments within the Task 1.1.6 and 1.1.9a reports, and as such, the task 1.1.9b Power Flow analysis results have been moved back slightly. Itron and CH₂ continue to await the results of the power flow analyses in order to complete the remaining elements of the Prioritized List of BI-PV and Biogas Projects.
- **Project 2.1:** As reported in March's Program report, the overall project start-date was delayed pending the completion of the Landfill Bioreactor Database and Inventory Report (Task 1.1.3). As of April, the Project is moving forward and work is proceeding as anticipated. 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.

- **Project 3.2:** The earlier delays which, have been encountered while Endecon awaited the signed Commonwealth-IEUA BI-PV power sales agreement continue to have residual affects on other Project 3.2 tasks, and will additionally affect the schedule for Project 3.3; however as the contractual issue has been resolved, Project 3.2 and Project 3.3 is expected to now move forward quickly. As reported in April, IEUA fulfilled the information requests from Commonwealth and with the IEUA Board, both parties approved and executed the contract.
- **Project 3.3:** Task 3.3.2 has taken longer than originally anticipated to complete, due to multiple outside technical reviews and the draft deliverable, although completed, continues to be in an evaluation phase. It is anticipated however, that it will be ready for submission to the Commission in mid to late July.

SIGNIFICANT PROBLEMS OR CHANGES:

As indicated above, five 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) is in process, and will be submitted to the Commission for review and approval, addressing any necessary changes in schedule for these projects. Current Program progress and expenditures will result in the Program being completed on time and within budget.

EXPECTED ACCOMPLISHMENTS DURING THE NEXT PERIOD:

Project 0: Program Administration

Project-specific administration support under Task 0.8 will continue relative to each active Project under the CE Program. Revisions and/or potential budget reallocations will continue and the CE Team anticipates submitting the draft revised Contract Exhibit B to the Commission Program Director in early July.

Monthly Status Reports will be drafted and submitted to the Commission for all six active Projects. Additionally, a Monthly Program Report will be drafted as well.

It is anticipated that Contract Invoice # 5 will be submitted in early June and will include Project 3.2 – Task 3.2.2.a (2). Additionally, Contract Invoice # 6 will be submitted in mid-June and will include Project 1.1 – Task 1.1.6 and Task 1.1.9a.

Project 1.1: Program Planning and Analysis

Activity will continue to focus on the identification and prioritization of the leading projects to be recommended for further consideration and evaluation under each of the subsequent implementation Projects in the Commonwealth Program. The final prioritization elements will continue to await the Mini-Grid power flow analysis results. However, the CE Team will continue to identify projects that may meet other identified Program objectives.

ZECO and Itron anticipate submitting the finalized Task 1.1.6 and Task 1.1.9a Final Reports to the Commission. Additionally, ZECO expects to complete and submit for internal CE Team review, the Task 1.1.9b power flow analysis draft report.

Itron anticipates finalizing and submitting the BI-PV and Biogas Market Potential Draft Report under Task 1.1.7. Additionally, the CE Team anticipates submitting the Final Report Outline under Task 1.1.11a for Commission approval.

Project 2.1: Enhanced Landfill Gas Production

The primary focus of activity will surround the completion of the waste characterization report for the Mid-Valley landfill. CH₂ anticipates that the report will be completed in early July.

A meeting has been scheduled with various regulatory agency and San Bernardino County staff in regard to the Yolo County Bioreactor Project, which will be held in Sacramento during June. It is anticipated that the results of this meeting will help develop the bioreactor project objectives at the Mid-Valley landfill site.

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

Information collection and assembly will continue in June on the different processes being analyzed as a portion of the Process Selection task. Discussions continued with Ingersoll-Rand (IR) regarding their fuel conditioning system and any possible applications for this project. Although work continues on the Process Selection Report, finalization awaits the power flow analysis results and report.

Project 3.1: Dairy Waste to Energy

In June, the primary focus will be on finalizing the Draft Technical Memorandum comparing the RP-1 and RP-5 to other *plug flow* and *complete mix* digester projects.

Other activities will include continued development of the testing protocols for the implementation of the suggested projects identified under the Project 1.1 prioritization task. Some of these projects are expected to include, co-digestion and improved pretreatment, as well as others. Efforts will continue to define an approach, which will facilitate incorporation of the results of the Task 3.1.1 comparative analysis and the Task 1.1.9b Chino basin Mini-Grid power flow analysis into the process and site selection activities of this project.

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

It is anticipated that the remaining purchase order and contracts for the Schott Applied Power 20 kW system, as well as a series of ten 2 kW systems will need to be issued.

Additionally, Endecon anticipates receiving commitments from vendors who have been chosen to provide the small systems at the PVUSA site. The commitments will be for either equipment loans or a reduction of price, which will minimize cost to the project.

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

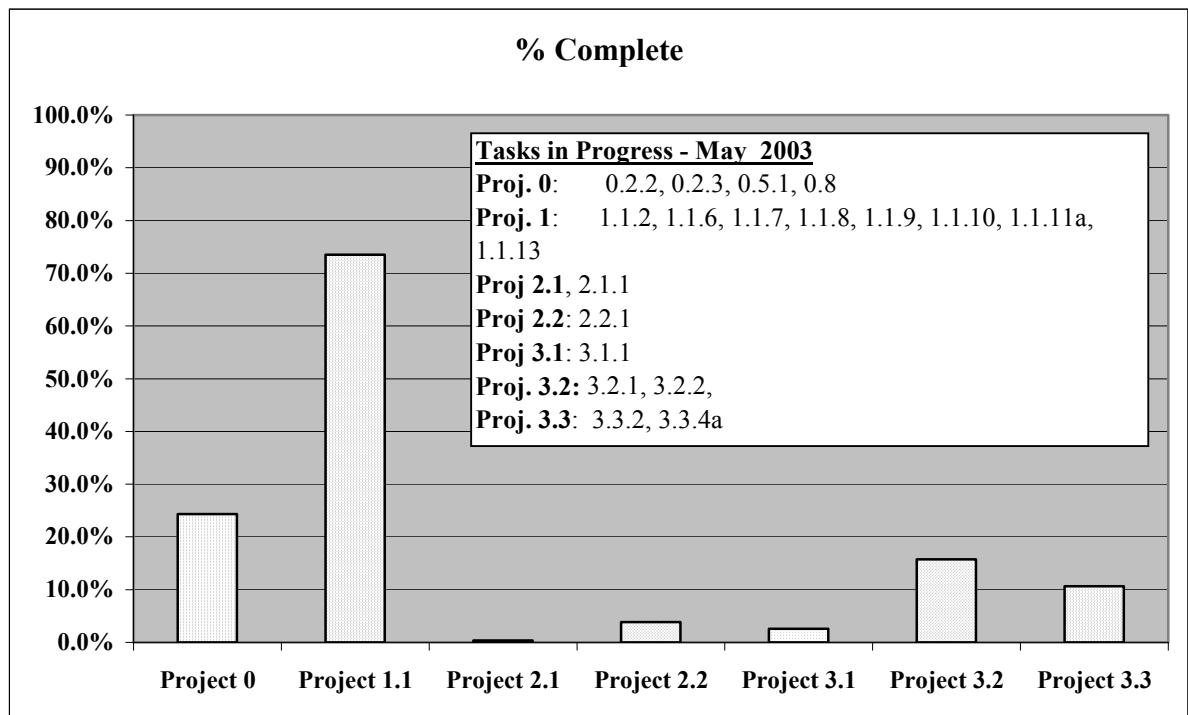
REDI anticipates compiling and incorporating the peer review and Itron review comments into the Draft Evaluation Tools Package. Once these comments have been addressed and incorporated, the draft deliverable will be submitted to the Commission for review and comments.

Additionally, REDI anticipates assembling background materials for all identified potential BI-PV Public Sector sites in preparation of the draft report under Task 3.3.4.

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:

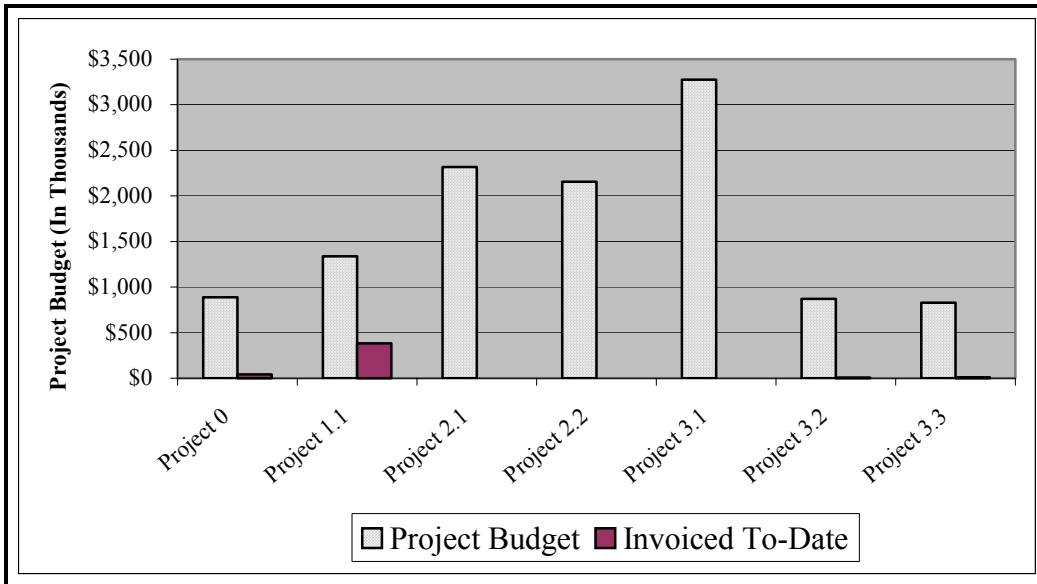
Table 1 and Figure 2 below summarize the fiscal status of the Commonwealth Program by Project as of the end of the current reporting period.

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	\$382,216**	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	\$8,514**	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.

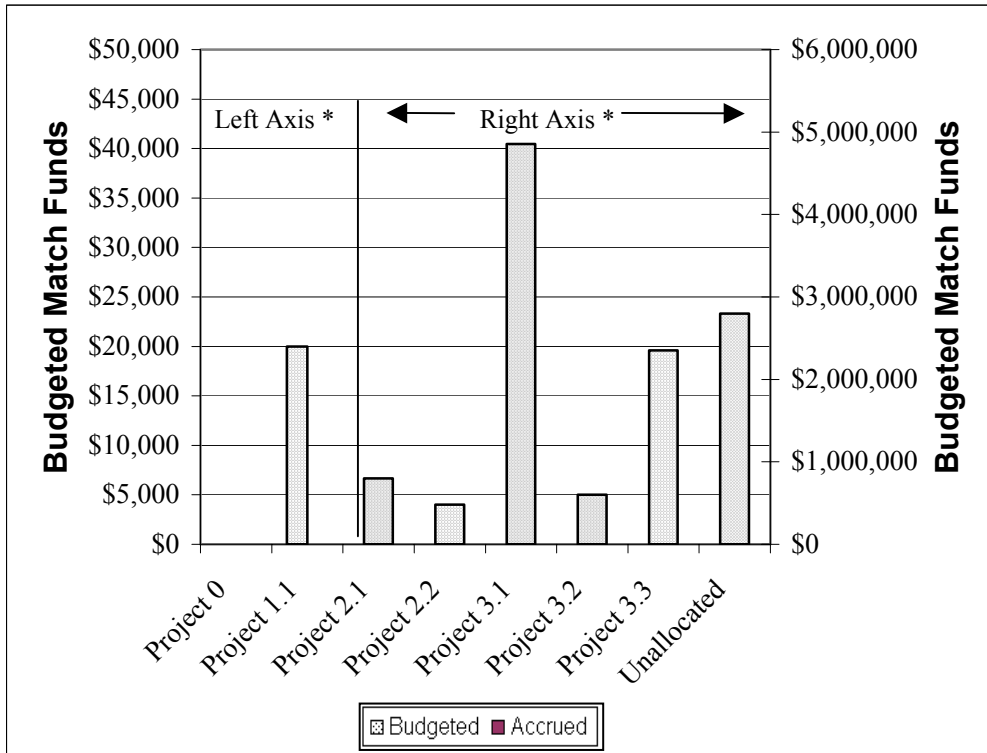
Figure 2: Program Fiscal Status - PIER Expenditures



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

OT
 OT
 OT
 OT
 OT
 OT
 OT

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.