

ACTION PLAN – 2003 UPDATE

REBUILD MAUI COMMUNITY COLLEGE

Introduction

Maui Community College Sustainable Technology program is continuing activities to assist our institution in identifying cost-effective energy management, energy conservation and sustainable energy potentials on campus. In this our fifth year of partnering with Maui Electric Company, we continue to pursue energy and operating savings opportunities.

Organization, Priorities, and Goals

Partnership

Our partner in this endeavor is Maui Electric Company (MECO). In addition to the PUC approved demand side management program, which includes cash rebates for customers initiating energy savings. MECO has assisted us with engineering services, one on one support through assigning an account executive to help us monitor our energy usage, and to assist in completing the paperwork for qualifying for rebates under their various programs.

Priorities

Priorities for the partnership continue to be focused on the management of our electrical power demand and usage. In 1994 our campus consisted of 29 buildings totaling approximately 205,000 sqft, of which approximately 75000 sqft was air-conditioned. Since then we have added six new buildings and extensively remodel a seventh. Our totals now are approximately 385,000 sq ft of which approximately 255,000 sq ft is air-conditioned.

Priorities include:

- 1) complete lighting retrofit
- 2) exterior lighting improvements
- 3) energy management system
- 4) vending machine controllers
- 5) combined heat and power generator/absorption chiller (CHP)
- 6) modified chiller consolidation

The following table reflects the first five Energy Conservation Measures (ECM), which provide a relatively sound payback.

	Estimated Cost	Estimated Savings	Estimated Rebate	Simple Payback
Lighting Retrofit	\$147,255.00	\$ 67,494.00	\$ 31,196.00	1.72 yrs
Exterior Lighting	\$ 7,200.00	\$ 1,901.00	\$ 400.00	3.58 yrs
Energy Management	\$100,387.00	\$ 23,000.00	\$ 0	4.36 yrs
Vending Controls	\$ 1,674.00	\$ 684.00	\$ 120.00	2.27 yrs
Modified Consolidation	\$570,000.00	\$ 48,036.00	\$ 36,718.00	11.10yrs
CHP	Pending			

Lighting Retrofit: Lighting is the first measure any facility should examine in its efforts to save money through energy efficiency. We have specified T8 lamps with electronic ballast for all new buildings and in areas where we replaced all bulbs. Our retrofit will convert all remaining T12 lamp w/magnetic ballasts to T8 lamp w/electronic ballasts with special optical reflectors, LED exit signs and occupancy sensors.

Preliminary estimate is that the campus can save an estimated \$67,494.00 annually by the installation of 2,118 electronic ballasts, 781 special optical reflectors and T8 lamps, 56 occupancy sensors and 71 LED exit signs.

The estimated cost of this measure is \$147,253.67, and the potential qualifying utility rebate is \$31,196.00. This provides a simple payback of 1.72 yrs.

Exterior Lighting: Power regulators and voltage stabilizers are gaining in popularity as a method to reduce energy costs in areas commonly illuminated by high intensity discharge lamps or common fluorescent lamps. These systems normally feature a microprocessor-controlled system to drive down HID and fluorescent lamps without allowing destabilization of the lamp arc. The installation of a lighting regulator system in the main parking lot will provide energy savings with minimal costs and disruption to the campus operation.

The anticipated cost for the system is \$7,200.00 with an anticipated energy saving of \$1,901.00 per year, and a utility rebate of \$400.00. This provides a simple payback of 3.5 yrs.

Energy Management System (EMS): The purpose of an energy management system is to control and monitor facility energy use. This control system is the most powerful tool for an energy manager as it contains useful, real time information which will allow for an educated decision on how energy is consumed on property. An EMS will also provide the trained user the ability to control the energy equipment in an efficient schedule and manner which will provide a tremendous energy savings opportunity.

The anticipated cost for the system is \$100,387.00 with an anticipated energy savings of \$23,000.00 per year. This provides a simple payback of 4.36 yrs.

Vending Machine Controllers. The vending machine controller reduces the energy use of refrigerated vending machines by shutting off lights when no one is in the vicinity, and reducing compressor time run while ensuring that cold drinks are served. A passive infrared occupancy sensor is used to control the display lights in the machine. An air temperature sensor is used to ensure that the duty cycle of the compressor is sufficient to maintain product temperature. An electrical current sensor monitors the load so that it is never powered down when the compressor is running. This eliminates high head-pressure starts so that wear and tear on the compressor is not increased.

The anticipated cost for the system is \$1,674.00 with an anticipated energy saving of \$684.00 per year, and a utility rebate of \$120.00. This provides a simple payback of 2.27 yrs.

Combined Heat and Power. We have been working with an investor to install a 400kw generator with absorption chiller to control our peak demand, power the campus during nights and weekends and produce chilled water for use in our distributed chill water system.

Initial cost estimate is approximately \$1,000,000.00 with savings to be realized from the reduction in demand, lower kWh rate, and using the heat from the generator to chill water for our distributed chill water system. We are still developing details for this initiative.

Chiller Consolidation. The existing chilled water distribution on campus is serviced by several different chillers:

- 2 each 350 ton Trane CVHE450 serving Kalama, Kupa`a, Ka`aike and Culinary Arts
- 1 70 ton Carrier and 1 70 ton York serving the Library and Student Center
- 1 80 ton McQuay serving Laulima and The Learning Center
- 1 Trane RTAA070 serving Ho`okipa
- 1 50 ton Carrier serving the Agriculture Building
- 1 20 ton York serving the Science Building

The variety of chiller plants on campus within a reasonably close proximity indicates that there are major inefficiencies in the way we cool the campus. Consolidating the primary chiller plants together will increase energy efficiency, because the current large chiller plant is under utilized, but is designed to handle nearly the entire campus load. Thus, connecting additional buildings to the main loop will increase the efficiencies of the main plant as well as shed the extremely inefficient loads.

The anticipated cost for the system is \$570,000.00 with an anticipated energy saving of \$48,036.08 per year, and a \$36,718.0 utility rebate. This provides a simple payback of 11.10 yrs.

Goal

Our main goal is controlling the increase in overall energy consumption, reducing our peak demand, and installing sustainable energy systems on campus.

Formal Partner

Maui Electric Company
Ed Reinhardt, President

Barriers

Potential barriers to effective program implementation include:

- 1) Resources – needing to rely on State of Hawaii funding in a time of fiscal downturn, and the absence of tax relief for performance contractors in our state.
- 2) Allocations – lack of authority to use funding allocated for other campus projects on our energy initiatives.

Development and Sustainability

With this plan, the partnership has a platform for attaining our mutual goals for development and internal sustainability. Through this local partnership and our partnership with Rebuild Hawaii and Rebuild America, we will develop a plan for continuing to expand our conservation initiatives and promote partnership savings and successes through press releases and educational programs on and off-campus

Continuing Rebuild Participation

We will continue to participate in the Rebuild Hawaii Consortium to keep in touch with the newest available technologies to continue to attain our partnership goal.