



TAKE AWAY

Concept

- Assess potential projects in an energy audit
- Design energy efficient central plant
- Upgrade automation to improve central plant control
- Oversee construction
- Commission systems

Features

Energy Efficient Central Plant System

- DDC Controls
- (2) 210 Ton Smardt Chillers
- Variable speed pumps

Benefits

- Annual savings of \$270,764 (\$0.30/kWh)
- Measured annual savings of 902,547 kWh
- 54% Annual savings on central plant operations from baseline year
- \$108,300 in Hawaii Energy rebates
- 2 Year payback including rebate incentives

NEW CENTRAL PLANT RESULTS IN 54% ENERGY SAVINGS!!!

Chelsea Group was retained by BSC Pearlridge Uptown II, LLC (“BlackSand”) to assess, design, oversee, and commission a central plant efficiency retrofit for the common areas of Pearlridge Mall, Uptown II building. The end result was a 54% annual energy savings on their central plant operations.

GOALS

The project included the following goals:

- Replace an aged and failing chiller plant with contemporary technology and new equipment
- Reduce the landlord operating costs for provision of cooling to the property



BACKGROUND

Pearlridge Mall is a landmark property made up of two separate shopping centers, Uptown and Downtown, located in the suburban area of Aiea. Pearlridge Mall is the largest indoor mall in Hawaii and for that reason requires large amounts of electrical power to operate the property.

Chelsea Group conducted a thorough energy audit in the spring of 2014 of the building on the Pearlridge Uptown II property, which is the Diamond Head (eastern) portion of the Uptown Mall. The owner reviewed the report and provided approvals to execute the implementation of the central plant upgrade.

The property was then upgraded with energy efficient equipment and direct digital control (DDC) systems for plant monitoring and to allow adjustments to the control sequence. Chelsea Group designed, managed the installation, and commissioned the replacement of the central plant. The new chillers installed were 210 Ton air cooled variable speed chillers manufactured by Smardt. Each pump was replaced with a 504 GPM variable speed pump with a new,





ABOUT CHELSEA GROUP

Services

- Mechanical design
- Construction management
- Commissioning
- Energy audits
- IAQ investigations
- Utility incentive support
- LEED® Certification
- ENERGY STAR® support

Qualifications

- 25 year track record of successful performance
- Winner of 2015 AEE Energy Project of the Year for Region V
- Hawaii Energy Clean Energy Ally
- ENERGY STAR Executive Member of Certification Nation
- Over 15 million square feet of LEED certified projects

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functional VFD. The existing distribution system and air handling units were not impacted except for the installation of a bypass pipe with modulating valve to accommodate low load conditions. Chelsea Group developed the controls algorithm to operate at optimal efficiency using the DDC control system.

RESULTS

The results of the project exceeded initial projections. While the base chiller performance absent controls tracks with specification, the implementation of the DDC control strategy to optimize performance resulted in a 20% improvement in performance over base specifications. At the same time, reductions in utility rates have benefited the project economics (\$/kWh dropped from \$.30/kWh down to \$.24/kWh upon project completion). The following table clarifies this result:

	Audit Savings Estimates	Base Year Actual	Post Project Energy Use	Energy Reduction	Savings %	Comparison to Audit
Annual kWh	709,427	1,669,391	766,844	902,547	54%	21%
Annual cost @ \$0.30	\$212,828	\$500,817	\$230,053	\$270,764	54%	21%
Annual cost @ \$0.24	\$212,828	\$500,817	\$184,043	\$316,774	63%	33%

NOTE: Chiller and pump energy use and cost only

Hawaii Energy provided a substantial rebate for the energy saved for the central plant project. The table below identifies the cost, savings, rebate and payback resulting from the project implementation:

	Results
Annual kWh Savings	902,547
Initial Cost	\$775,050
Annual Savings	\$270,764
Rebate	\$108,306
Simple Payback (Months)	24.5

The project as a whole was a complete success. The property now has a new central plant, plant operations are 54% more energy efficient (saving \$240,000 annually), and with incentives, the central plant replacement has a payback of roughly two years.

[Click here](#) to see the chiller replacement in an accelerated time lapse video!

