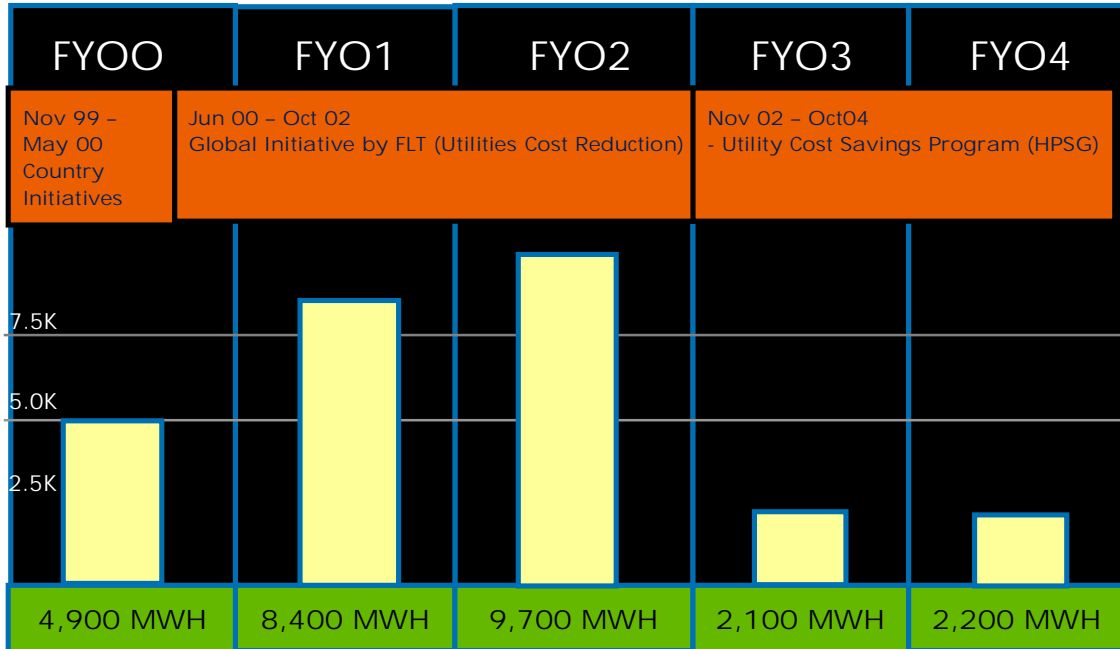

Hewlett-Packard Singapore Plans Ahead for Energy Conservation

Energy conservation has always been a primary focus of Hewlett-Packard Singapore's Facilities Operations team for many years, even before the increased pressure of oil price hikes. Hewlett-Packard Singapore's energy conservation efforts can be traced as far back to the mid-90s. It was managed as a site-wide program until late 1999 before being transformed into a global cost reduction initiative for two years. Subsequently, the initiative took on a broader scope and continues till today as a utility cost savings program.



These efforts have paid off and for the past five years, HP Singapore has managed to save 27,000 mega watt hours which is equivalent to the power consumed by about 11,000 five-room households for five years¹.

What did we do?

Our conservation efforts focused on three main areas of improvement. First, we looked at our system efficiency. Through a systematic screening process and detailed engineering economic analysis, we were able to identify numerous projects to improve efficiency. This was a key factor as we realized 65% of our achievement from completing these projects.

Second, we examined our operational patterns. We changed our control capabilities to suit our end users' needs. Automatic controls were installed for operation efficiency and set points were optimized to reduce energy wastage. This was a difficult task because of

¹ Based on statistic from SP Services updated *on Household Average Consumption for Electricity, Water and Gas* published in <http://services.spservices.sg/> on 13 Sep 05

the learning curve to understand user requirements in the absence of established documentation. In one of our projects, we were able to optimize fresh air to one of our manufacturing buildings resulting in an annual savings of 500 kilowatt hours in less than eight months since the change.

In the final area, we advocated the practice of a “shut down when not in use” policy. We reviewed all building support system schedules, such as air-conditioning and lighting, and shut them down during off-peak periods. We also implemented a zoning concept for switching utilities on in specific areas instead of for an entire floor. From an employee perspective, we actively cultivated in them the good practice of switching off lights and equipment when they leave the office at the end of the day.

For the list of completed projects, please refer to the below table.

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| 1. System Efficiency Improvement | <ul style="list-style-type: none"> • Condenser Water Integration (Process/Building) • Electronic Ballast / Voltage Reduction for Lighting • Full Mirror Reflector Light Fitting • Condenser Water Tube Cleaning System for Chiller • Conversion of FCU from air cooled to chilled water • AHU Fan Efficiency Improvement • Auto-drain for Air Compressor System • Fresh Air Optimization • Cooling Tower with Variable Speed Drive • Auto-start-stop System for Escalator • Dedicated Air Cooled System for 24hr office / store |
| 2. Operation Efficiency Improvement | <ul style="list-style-type: none"> • AHU Variable Speed Drive Optimization • AHU / Chiller Set-point Optimization • Timer Control for Office Area • Light Tube Reduction • Compressor Set-point Optimization |
| 3. Operation Optimization | <ul style="list-style-type: none"> • Operating Hour Reduction for Chiller • AHU Set-point Setback at Night • FCU Shutdown at Office/Aisle during off-peak • Lighting Shutdown during off-peak • PCW Pump Shutdown |