



# Walt Disney World's Energy Star Program

## Sustainable Energy Management – Walt Disney World's Approach

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Reedy Creek Energy Services

Walt Disney World



# Energy Fundamentals

$$\text{Rate} \times \text{KW} \times \text{Hours} = \text{Electric \$}$$



Utility



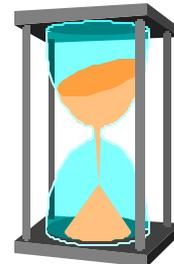
Lowest  
Purchased  
Fuel & Power  
Costs



Design



Energy  
Efficient  
Products

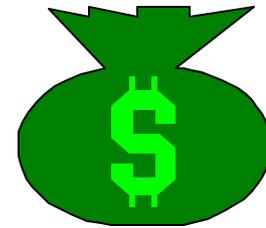


Operator



Energy  
Management  
Systems/Utility  
Monitoring

=



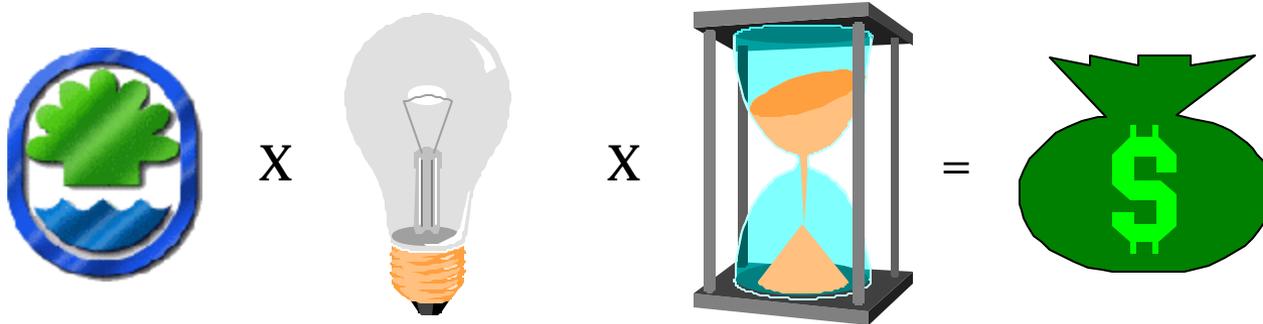
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# Energy Cost Example

## Increase Efficiency



60 watt Incandescent

$$\$0.066/\text{Kwh} \times 0.06 \text{ Kw} \times 8760 \text{ Hrs} = \$ 34.69$$

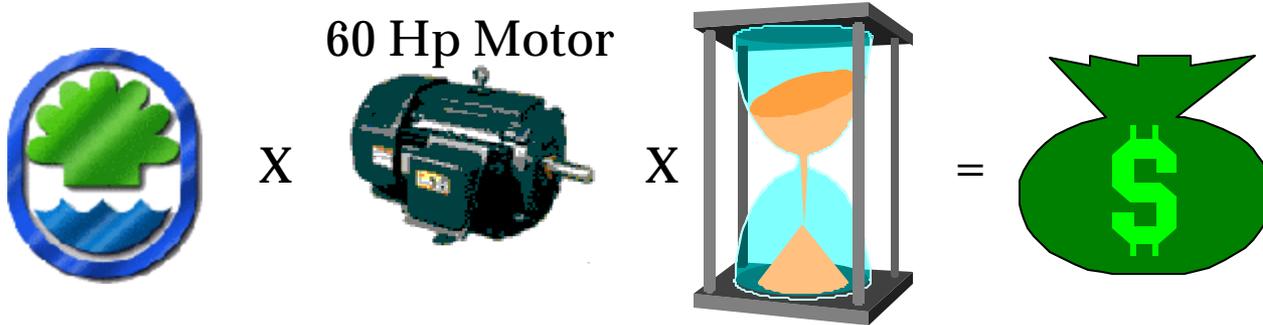
15 Watt Compact Fluorescent

$$\$0.066/\text{Kwh} \times 0.015 \text{ Kw} \times 8760 \text{ Hrs} = \$ 8.67$$



# Energy Cost Example

## Reduce Hours



24 Hrs/Day Operation

$$\$0.066/\text{Kwh} \times 45 \text{ Kw} \times 8760 \text{ Hrs} = \$ 26,017$$

16 Hrs/Day Operation

$$\$0.066/\text{Kwh} \times 45 \text{ Kw} \times 5840 \text{ Hrs} = \$ 17,344$$



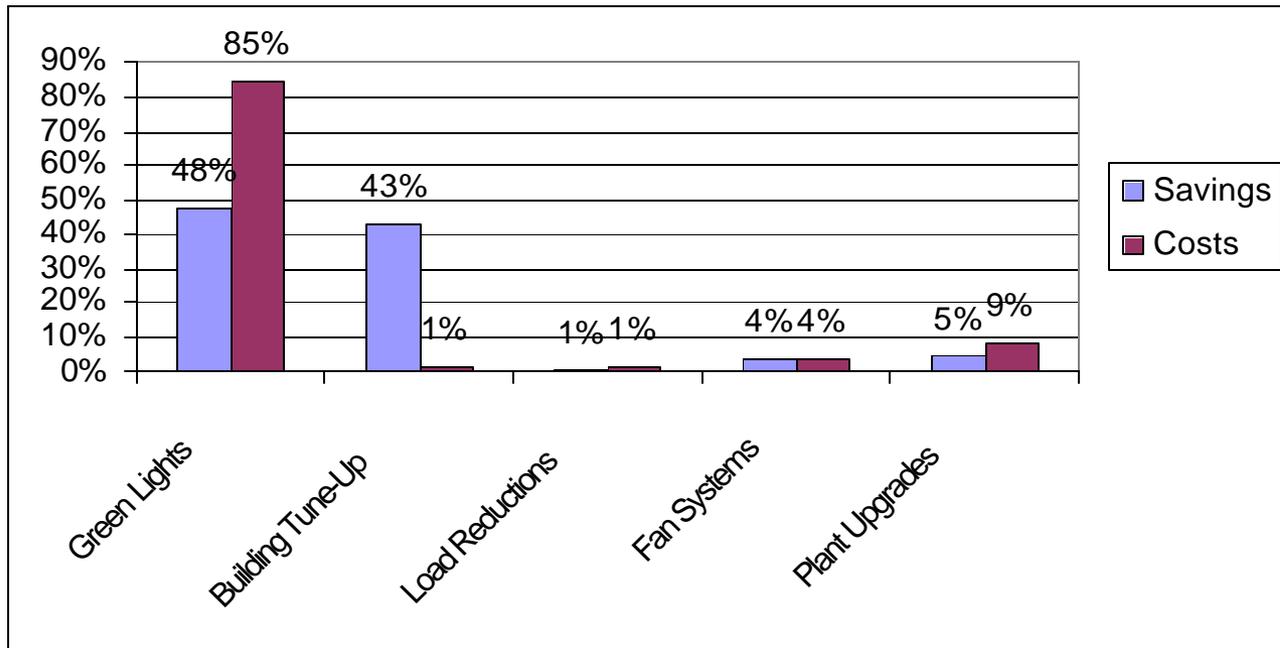
# Energy Star Buildings Program

1. Green Lights Upgrades
- 2. Building Tune-Up**
3. Load Reductions
4. Fan System Upgrades
5. Heat and Cooling Plant Upgrades





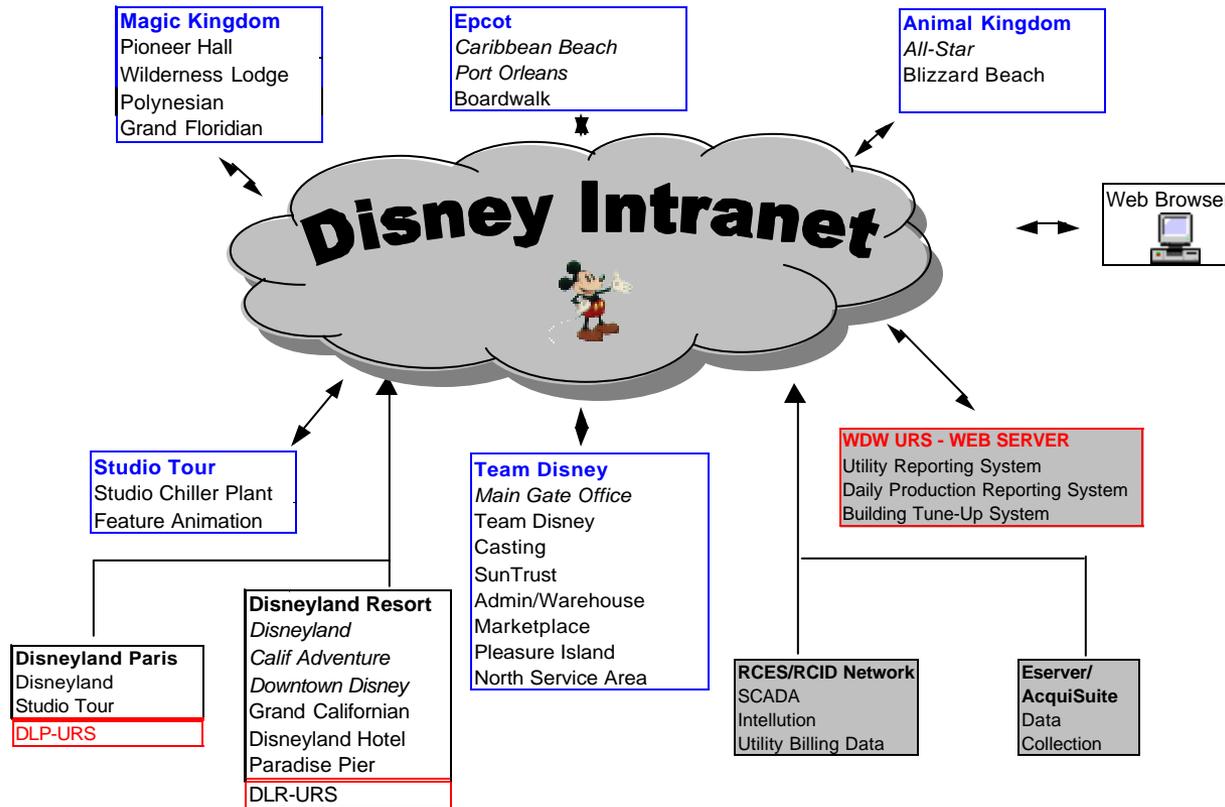
# Energy Star Results



Overall Program Results – 44% IRR



# Walt Disney World Energy Management System





# Energy Management Field Panels



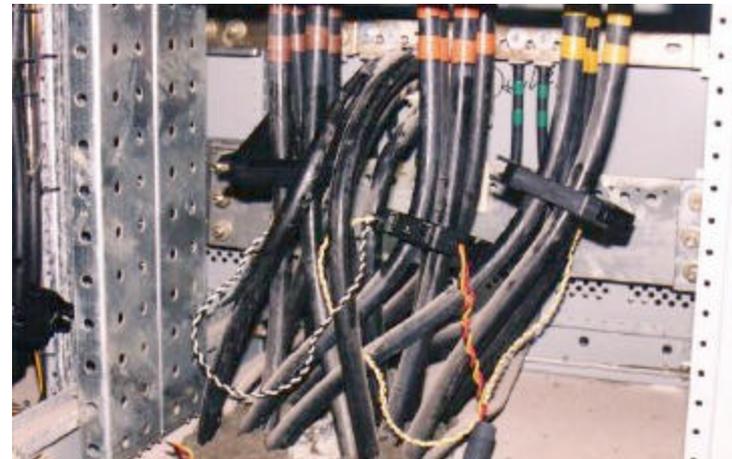


# Chilled Water Plant





# Electric Sub-Meters





# Energy Information System

- **Server Programs**

- Windows NT Server
- Internet Information Server (IIS)
- Microsoft Visual Foxpro
- Foxweb ([www.foxweb.com](http://www.foxweb.com))
- KavaCharts ([www.ve.com](http://www.ve.com))
- Autotask 2000 ([www.cypressnet.com](http://www.cypressnet.com))



- **Client Programs**

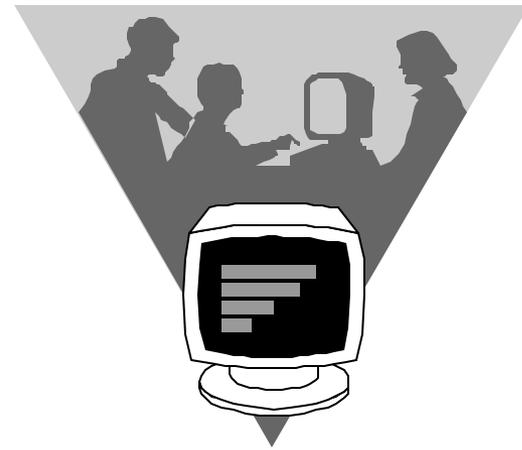
- Netscape
- Internet Explorer





# Utility Reporting System (URS)

- **Intranet Database Program**
  - Use web browser to graph and report utility usage
- **Monthly Billing Data**
  - Utility bill data downloaded monthly from utility
- **Hourly Interval Data**
  - Power monitoring systems
  - Energy management systems
  - Other submetering systems
- **URS Demo**





# Building Tune-Up Process

- **Tune-Up HVAC Control System**
  - Optimize time/setpoint schedules
    - Auto-reset daily
  - Understand energy management system control strategies
- **Repair Controls that have Failed**
  - Control valves, dampers and sensors
- **Measure Utility Consumption**
  - Track monthly utility bills
  - Install submetering strategically
  - Publish the data on an Intranet





# Building Tune-Up BTU Team Structure

- Facilitator
  - Energy Management Engineer
- Team Leaders
  - Maintenance/Engineering Services
  - Productivity Manager
- Members
  - Operations
  - EMS Vendor Support (if needed)





# Building Tune-Up System (BTUS)

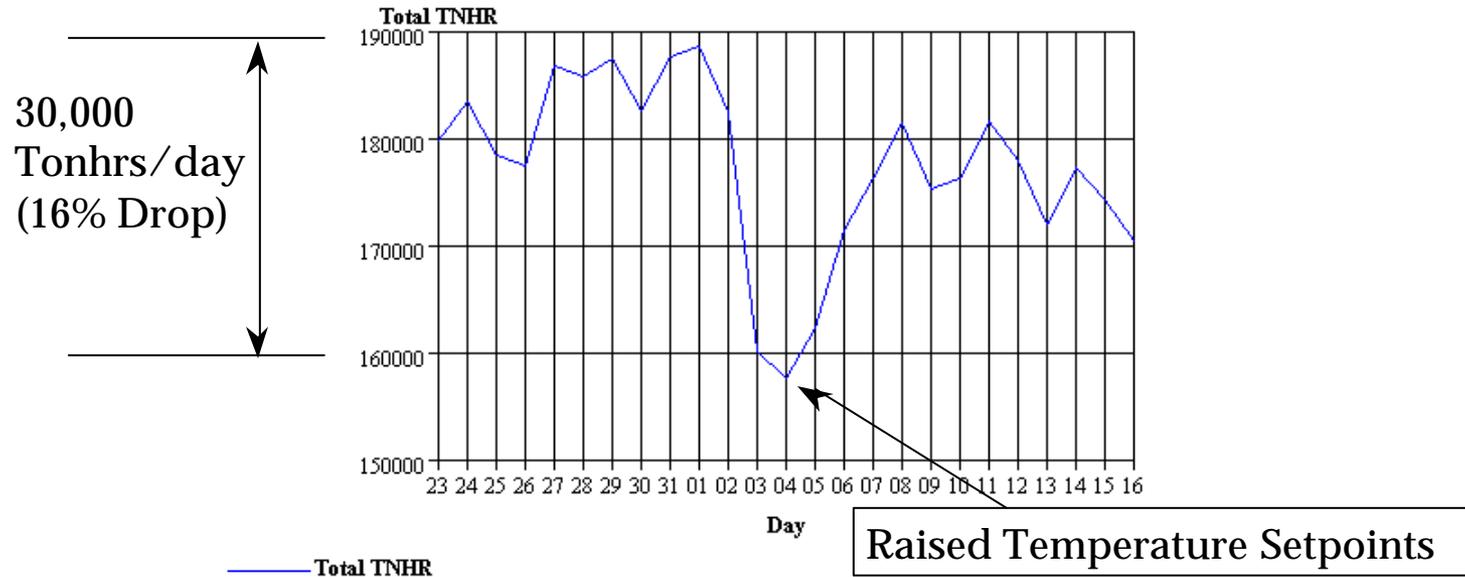
- **Energy Management System**
  - HVAC Equipment
  - Time Schedules
  - Setpoint Schedules
  - Link to Temp/RH Trends
- **Facility Time Schedule Program (FTS)**
  - Nightly Download of Time and Setpoint Schedules
- **BTUS Demo**





# Epcot's Building Tune-Up

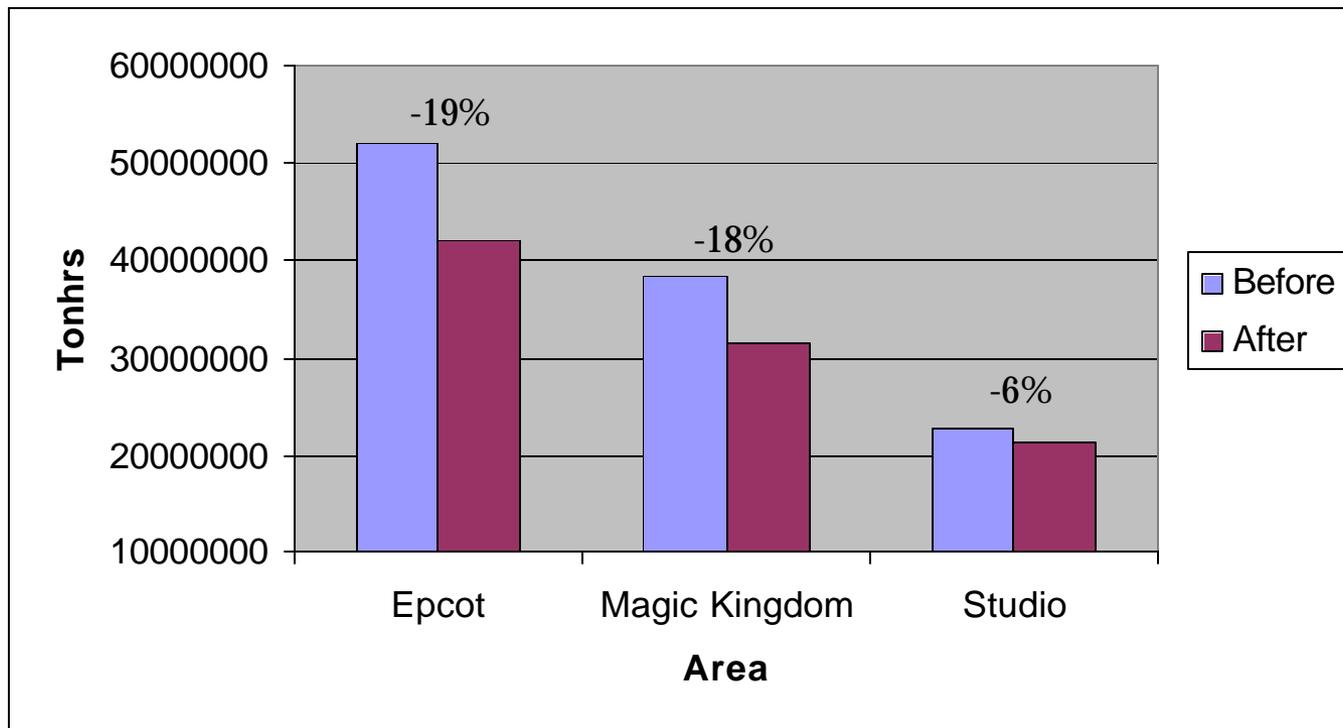
DAILY TOTAL Graph of TNHR PROFILE for Subarea; ECEP-PLANT-CW; ECEP-PLANT-CW



Lesson Learned: Slow & Steady Wins the Race



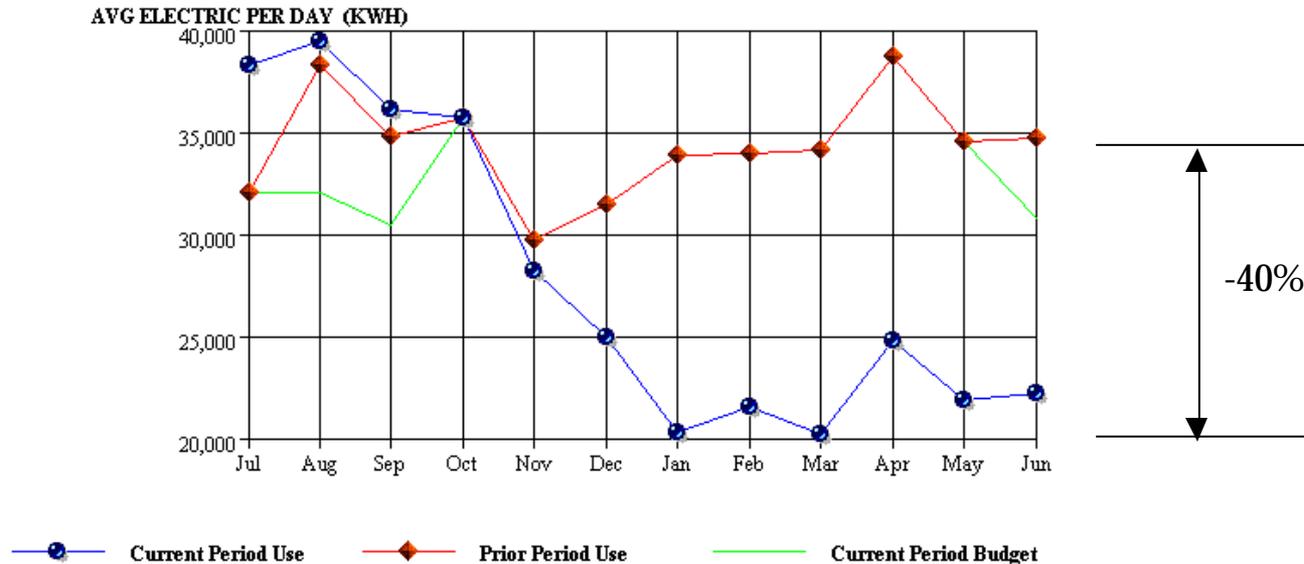
# Chilled Water Savings





# Sports Complex Energy Saving Mods

WDW SPORTS AREA Cost, Consumption and Budget Comparison, Month Range Jul FY 1998 to Jun FY 1999

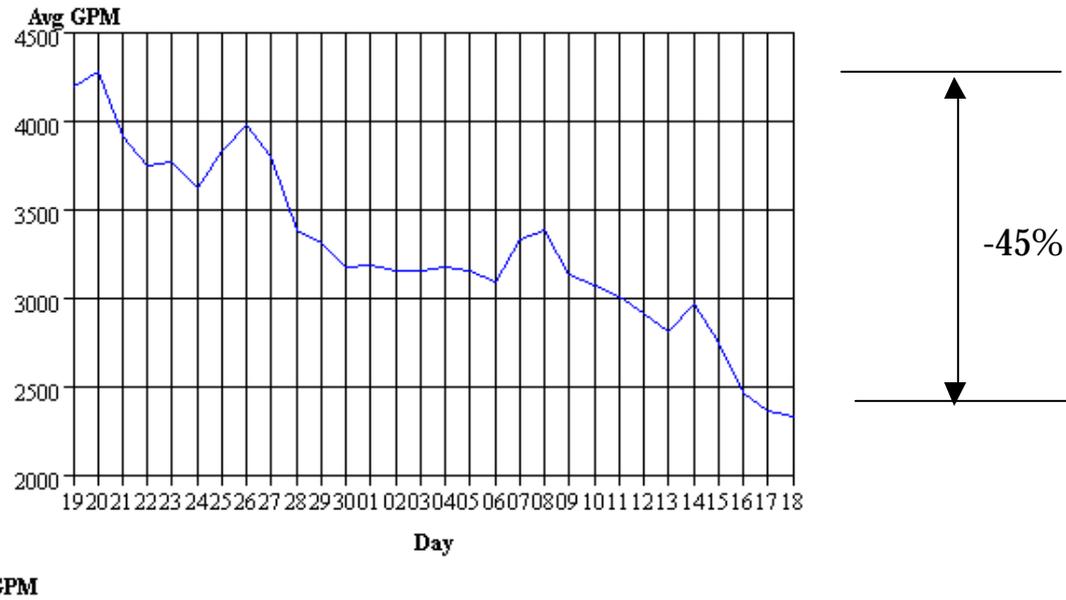


Installed VSD on HVAC Units, Optimized Control Algorithms, Used CO2 Sensors to Control Outside Air



# Coronado Springs Chilled Water Flow

HOUR(S) 1-24 Graph of GPM PROFILE for Subarea; CORONADO SPGS; CHILLER PLANT

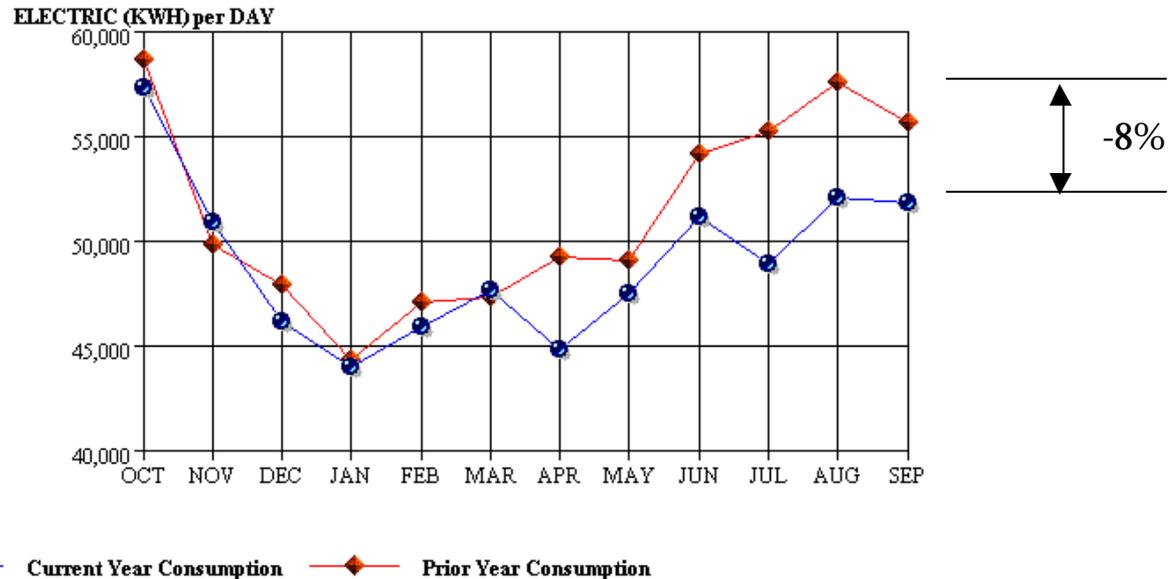


Repaired Chilled Water Valves – Reduced Flow



# Coronado Springs HVAC Mods

CONVENTION/COMMERCIAL CENTER Subarea Billing Data FY 2001

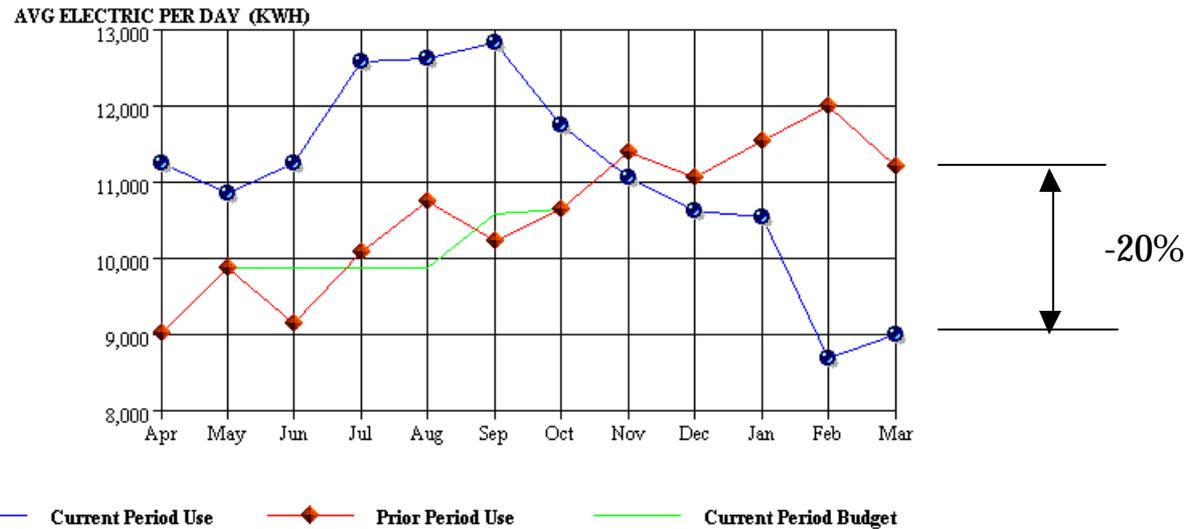


Installed Chiller Plant Monitoring System, CO<sub>2</sub> Sensors on HVAC units to Control Outside Air



# Cirque du Sol BTU

CIRQUE DU SOL AREA Cost, Consumption and Budget Comparison, Month Range Apr FY 2000 to Mar FY 2001



Used Energy Management System to Turn off HVAC units at night. Raised Temperature Setpoints.



# Project Tracking System (PTS)

- **Energy Management Project Database**
  - Project Scope
  - Date Completed
  - Energy/Dollar Savings
- **Management Reporting**
  - Project Summary Report
  - Calculation Backup
- **PTS Demo**





# Green Lights Project

- 16.7 Millions SF Upgraded
- Annual Savings: 46 Million Kwh
- IRR - 24%



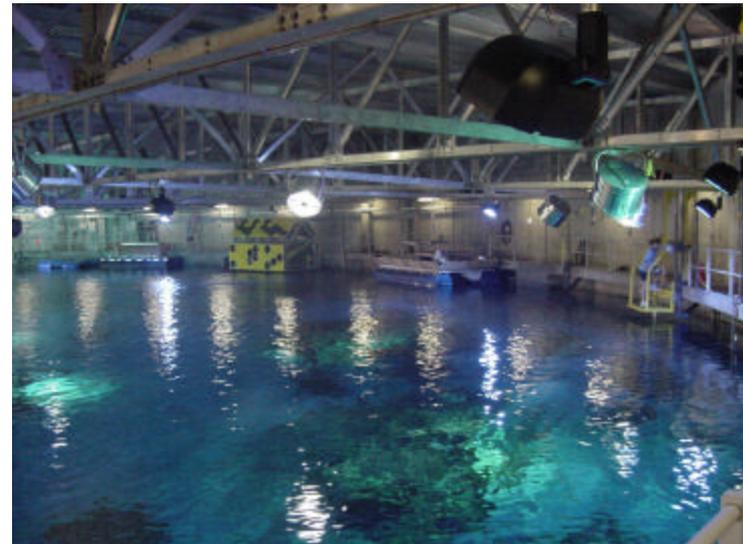


# Living Seas Tank Lighting



Before – 1000W Fixtures

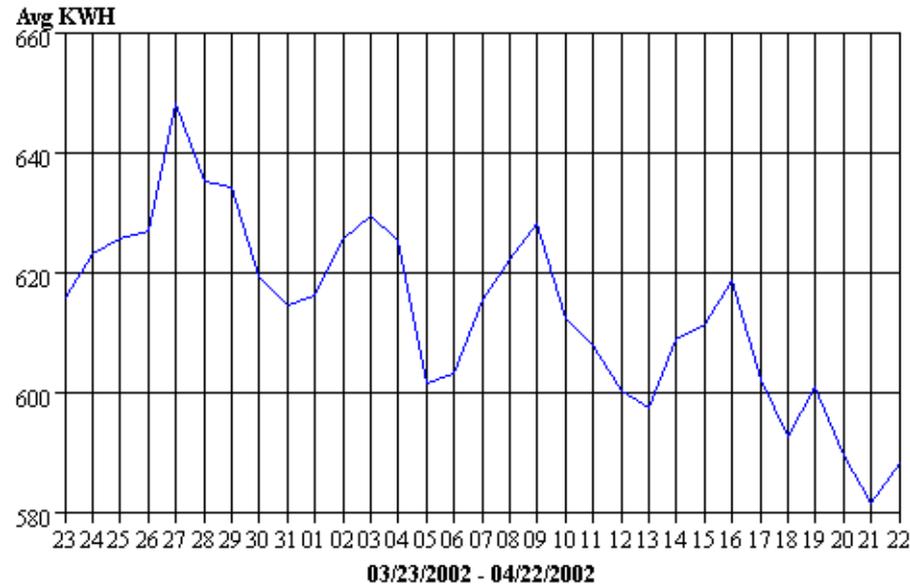
After – 250W & 400W Fixtures





# Living Seas Tank Lighting

HOUR(S) 13-18 - Division = PARKS - Area = EPCOT  
SUBAREA = SEAS



50 KW

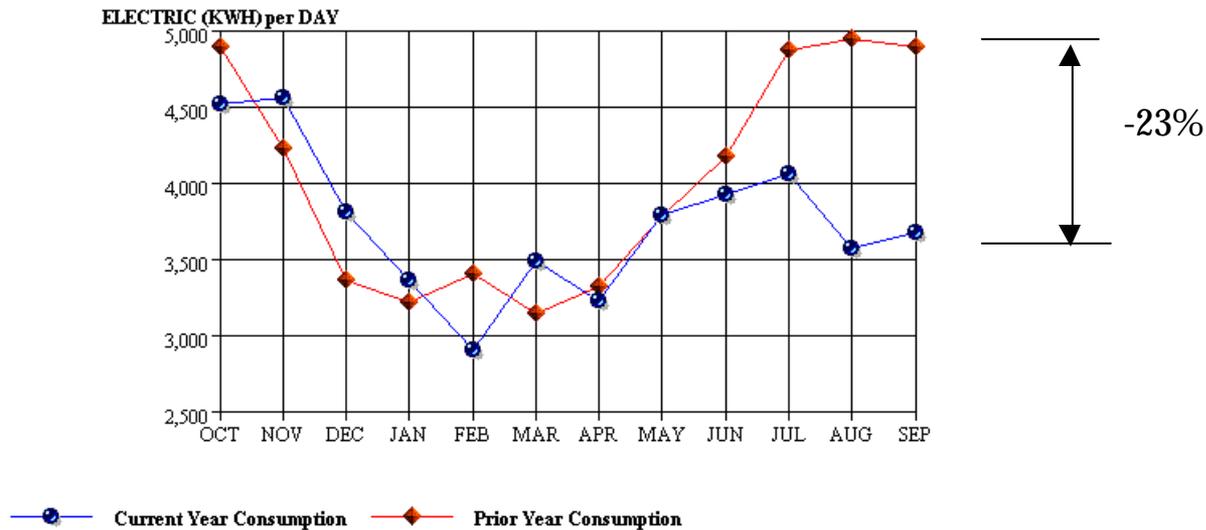
— ELECTRIC



# Energy Star Projects

## VSD Motor Controls

610 SYCAMORE STREET Subarea Billing Data FY 1999

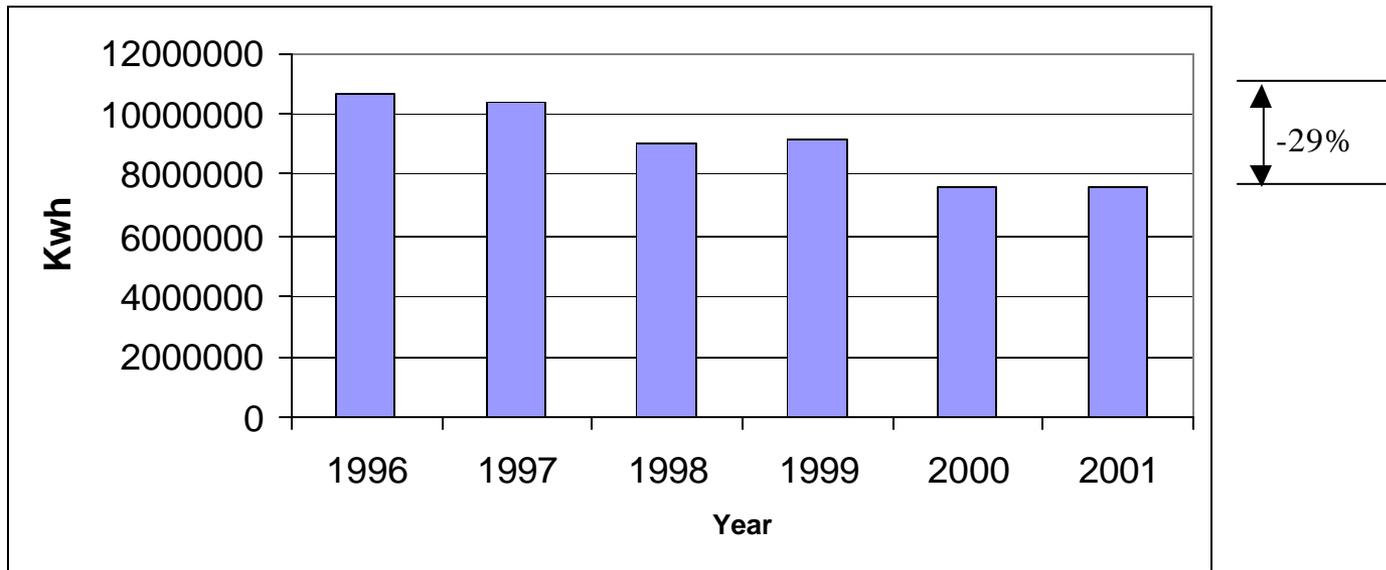


Celebration Building C2 - Installed Variable Speed Drives on condenser water pumps.



# Compressed Air Optimization

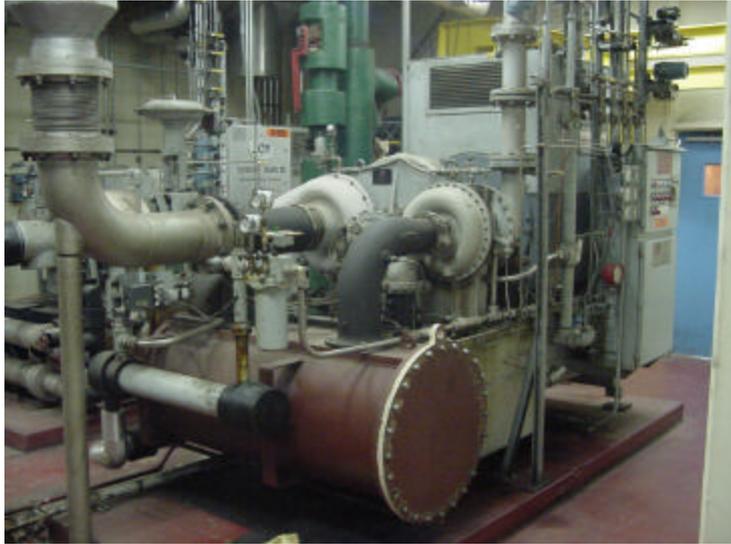
CEP Air Compressor Electric Consumption



Repaired Air Miser Controls, Fixed Compressed Air Leaks.  
3 Million Kwh Annual Reduction



# Air Compressor Controls



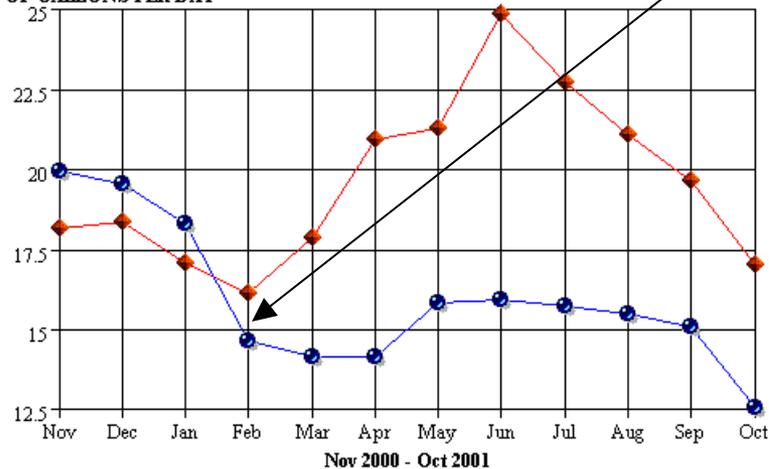


# Daily Production Report

## Water Savings Reductions

Monthly Profile for WDW, WATER, TOTAL CONSUMPTIVE USE - Avg.

MILLIONS OF GALLONS PER DAY



Start Water Restrictions

Water Savings:

- 2 Billion Gallons
- 28% Reduction

—●— Current Year —◆— Prior Year

Used Reclaim Water for Cooling Towers, Park Wash Down, Reduced Irrigation Frequency.



# Energy Star Team

- Meets Monthly on 1st Friday
- Share ideas to reduce utility costs
- Vendor Presentations
- Energy Management Training





# Energy Star Awards

- Recognize the “Stars” of Energy Conservation
- Provides “Competition” between Areas
- Areas are ranked - % reduction from Prior Year
- Report is generated using Utility Reporting System
- Yearly awards





# Energy Star Awards Report

AREA	ELEC (KWH)	CHW (T-HR)	HW (BTU)	GAS (THM)	WAT (GAL)	SEWR (GAL)	REF (\$)	PCT CHG
Grand Fl	-0.27	-3.23	0.00	-10.20	-0.71	-8.12	-22.58	-4.58
Caribbean Beach	0.99	0.00	0.00	7.89	-11.29	-10.38	-3.81	-2.14
Yacht & Beach	-0.44	0.00	0.00	-7.39	-1.13	-5.74	7.69	-1.68
Polynesian	2.87	9.65	0.00	-2.55	-17.24	-21.69	2.18	-0.43
Contemporary	-1.56	-1.41	8.47	-0.62	-8.95	-8.95	-9.22	-0.03
Dixie Landings	-0.31	0.00	0.00	-3.85	6.40	13.27	-3.43	2.28
Village Resorts	2.65	0.00	0.00	-13.69	8.11	6.34	-100.0	3.10
Ft. Wilderness	11.44	0.00	0.00	28.87	-3.70	-3.70	-10.41	4.77



# Future Projects

- **Utility Analysis Program (UAP)**
  - Utility usage by facility type
  - Load profiles
- **Chiller Plant Delta-T Improvement**
  - Delta-T and Flow daily report



# *Utility Reporting System*

