Higher Education Energy Efficiency Partnership Program

BEST PRACTICES AWARDS

UC / CSU Sustainability Conference, June 2005

A program created by the
UC/CSU/IOU Partnership
under the auspices of the
California Public Utilities Commission

CSU

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PUBLIC INTEREST ENERGY RESEARCH
"Research Powers the Future"

Energy Efficient Operations
Load Management

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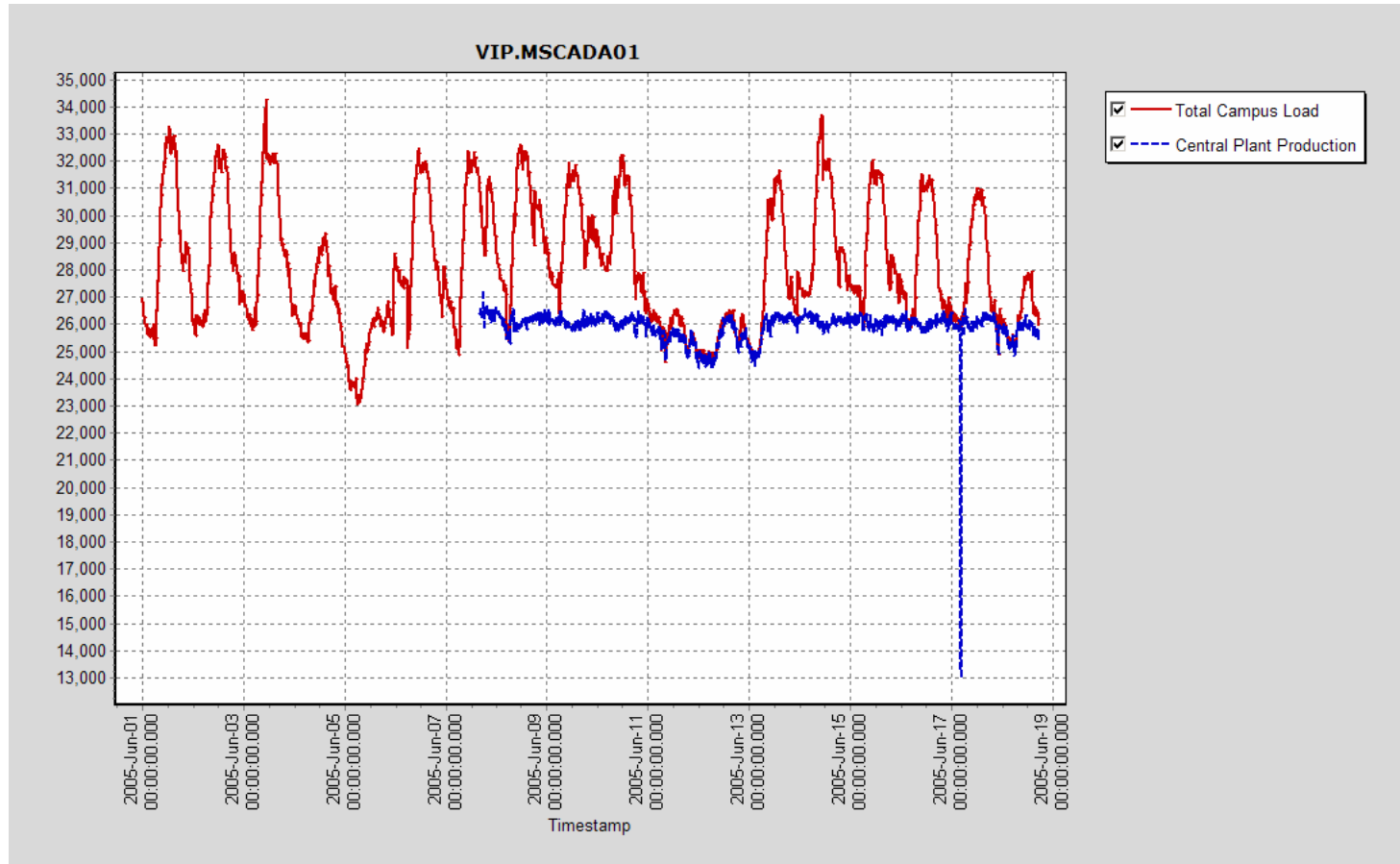# UCSD Best Practices for Load Management and Demand Response

- **Basics**
  - Implement specific zone level (t-stat) control parameters to increase energy savings during low occupancy.
  - Program system to simultaneously active the parameters to shed load during critical peak power times.
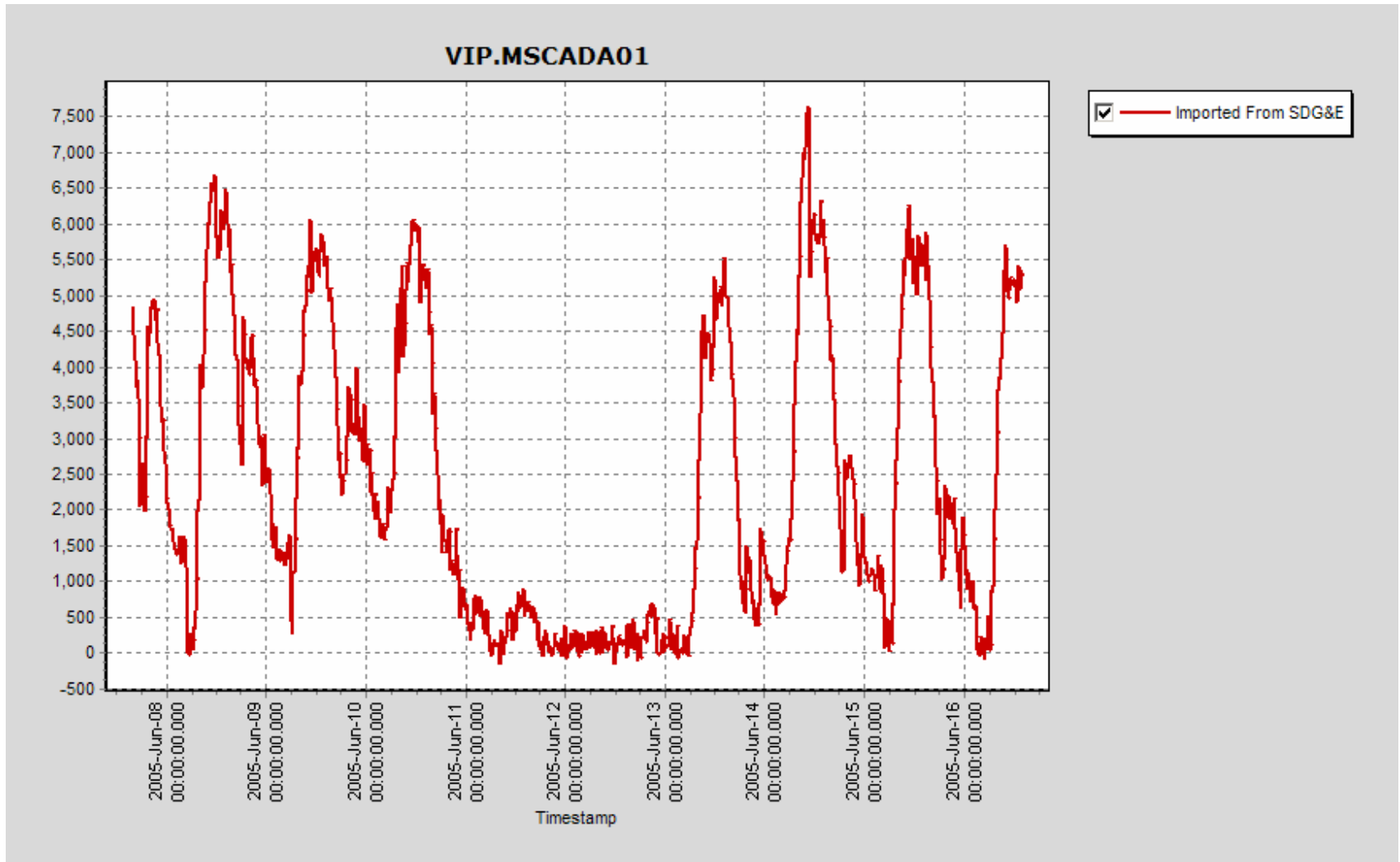 - Benefit financially.
- **Critical Components**
  - Adequate technology for control sequences and in house staff to program/understand system.
  - Expert knowledge of critical spaces in the buildings.
  - Support from Campus.
  - Metering and Monitoring System to prove results.

UCSD Load Prolfile

Load Profile Imported Power Only

Project Process

- **Crucial Decision**
  - Change paradigm
  - Individual programming of over 4,000 t-stat

- **Expertise on Staff**
  - Zone Maintenance
  - Energy Management System
  - Outreach

- **Program**
  - Code writing
  - Test and Modify
  - Continuously Maintain

Technical Overview

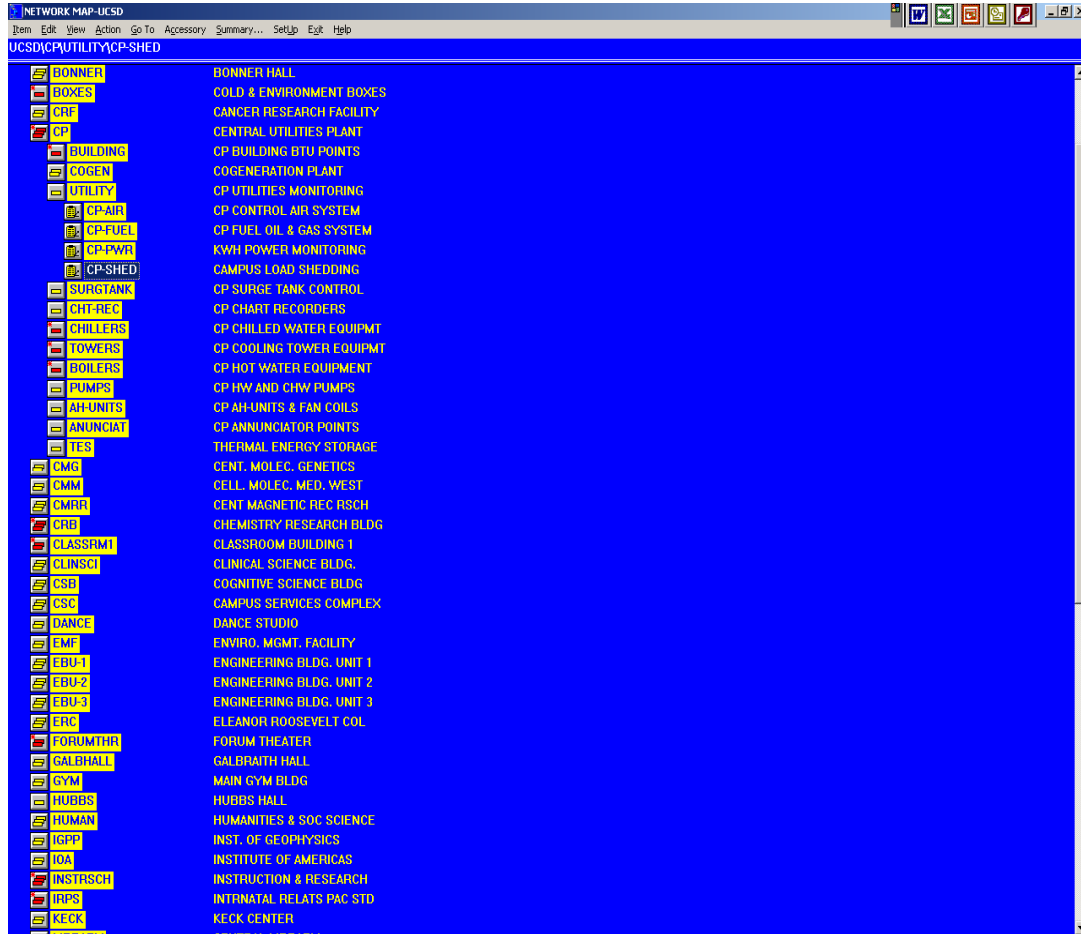- **Setpoint Parameters**
    - Occupied 70 – 74 M-F 9am – 4:30pm
    - Standby 68 – 76 M-F 4:30pm – 8pm, 6am – 9am
    - Unoccupied 68 – 78 M-F 8pm – 6am, 24hr SS/Holiday

- **Demand Response**
    - Forces zones into unoccupied mode
    - Static pressure setpoint setback
    - Discharge Air Reset
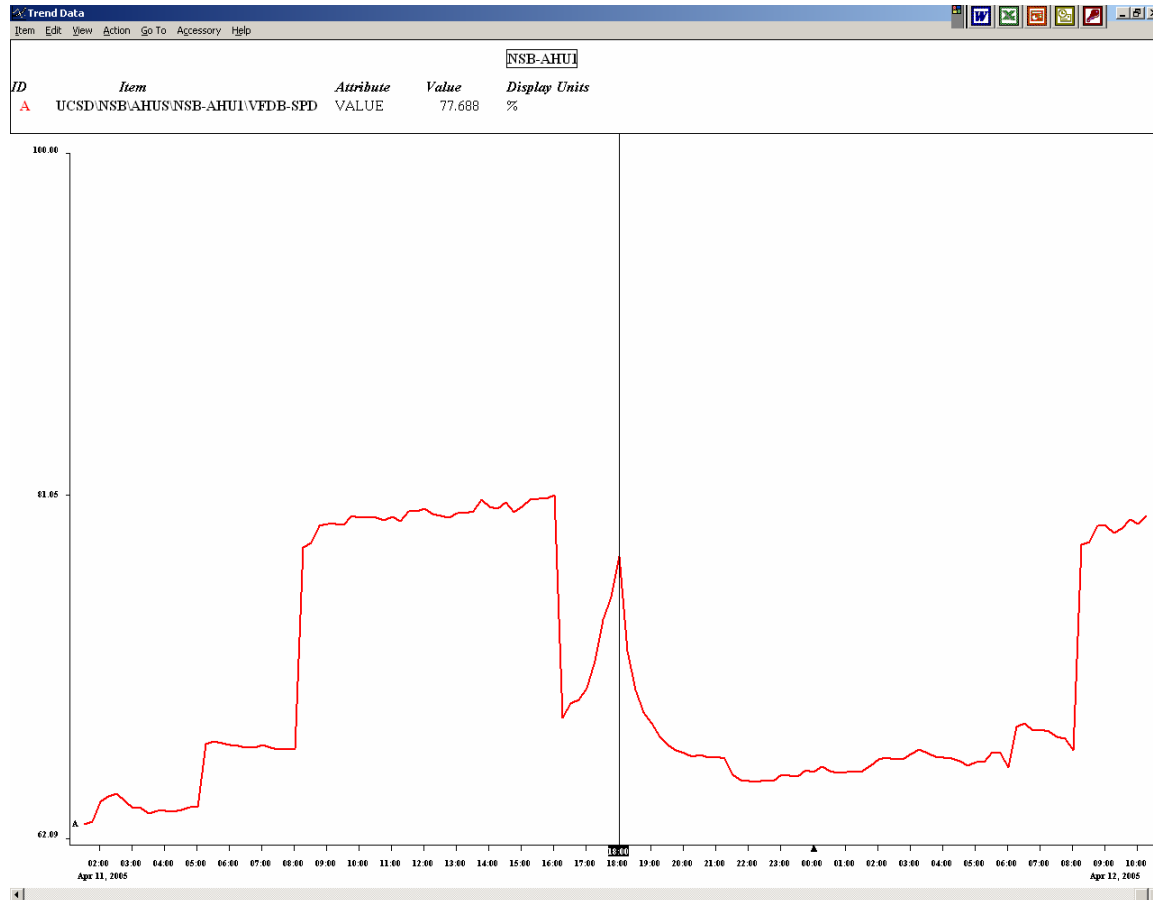   - Duty Cycling of fans not on variable frequency drives

Operator Interface
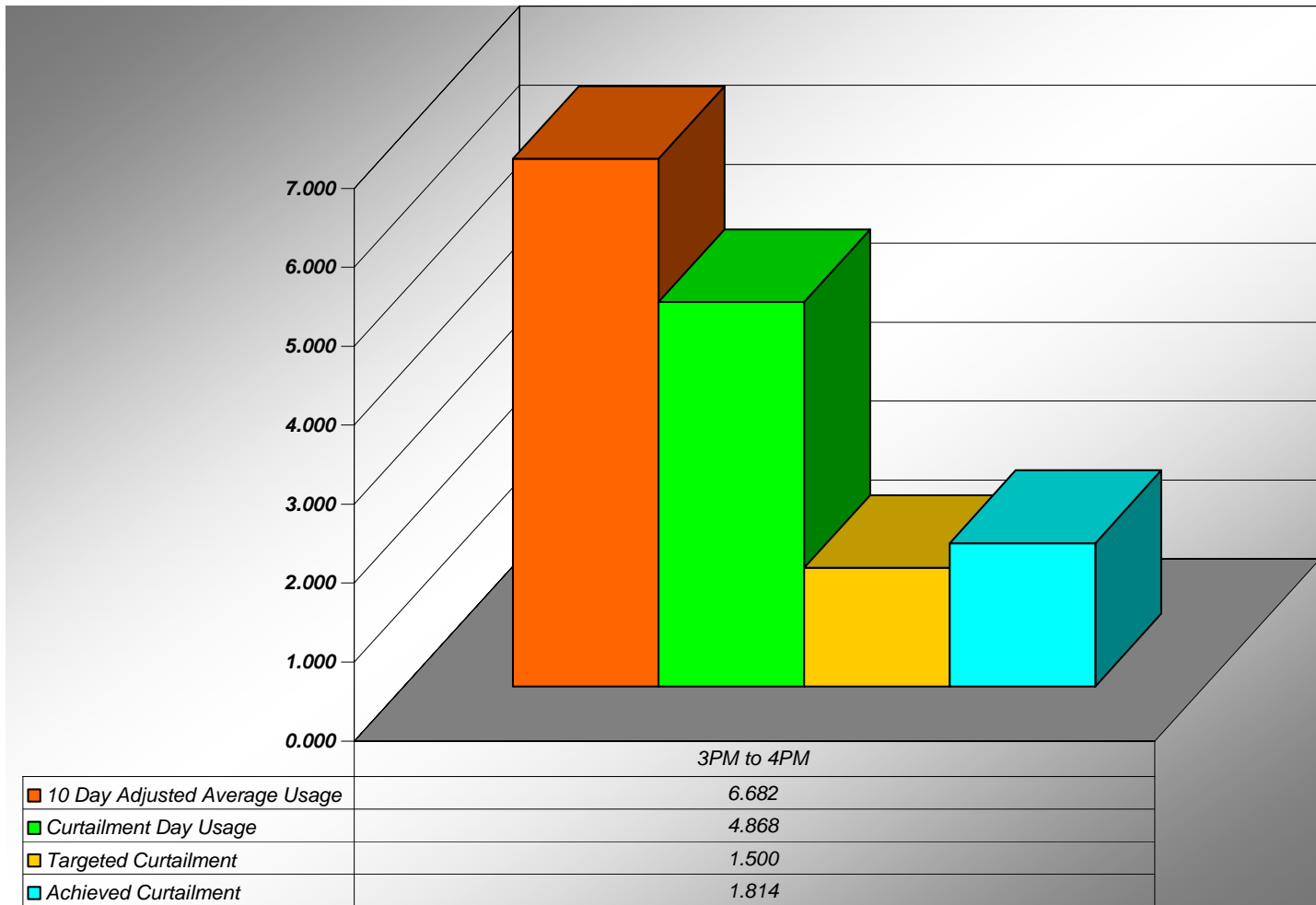
Text Screen to Implement Load Shed

CP-SHED				_ □ ×

Item Edit View Action Go To Accessory Help

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UCSD      CAMPUS WIDE NETWORK
CP        CENTRAL UTILITIES PLANT
UTILITY   CP UTILITIES MONITORING
CP-SHED   CAMPUS LOAD SHEDDING
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Status	Item	Description	Value	Units
SWO	REVELLE	ALL REVELLE BLDGS SHED	NOSHED	
SWO	MUIR	ALL MUIR BLDGS SHED	NOSHED	
SWO	WARREN	ALL WARREN BLDGS SHED	NOSHED	
SWO	SofM	SCHOOL MED BLDGS SHED	NOSHED	
SWO	SIO	ALL SIO BLDGS SHED	NOSHED	
	COLDDECK	COLD DECK SETPOINT	OFF	
	MAYRSHED	MAYER HALL GO SHED LOADS	NOSHED	
	UREYSHED	UREY HALL GO SHED LOADS	NOSHED	
	GH-SHED	GALB HALL GO SHED LOADS	NOSHED	
	PH-SHED	PAC HALL GO SHED LOADS	NOSHED	
	USB-SHED	USB (YORK) GO SHED LOADS	NOSHED	
	BH-SHED	BONR HALL GO SHED LOADS	NOSHED	
	APM-SHED	AP&M GO SHED LOADS	NOSHED	
	P&L-SHED	P&L GO SHED LOADS	NOSHED	
	HSS-SHED	H&SS GO SHED LOADS	NOSHED	
	CSB-SHED	COG SCI GO SHED LOADS	NOSHED	
	CRB-SHED	CHEM RSCH GO SHED LOADS	NOSHED	
	MC-SHED	MANDVL CTR GO SHED LOADS	NOSHED	
	MED-SHED	MEDIA CTR GO SHED LOADS	NOSHED	
	IRPSSHED	IRPS GO SHED LOADS	NOSHED	
	EBU2SHED	EBU-2 GO SHED LOADS	NOSHED	
	EBU1SHED	EBU-1 GO SHED LOADS	NOSHED	
	CLS1SHED	CLASSRM-1 GO SHED LOADS	NOSHED	
	I&R-SHED	I&R GO SHED LOADS	NOSHED	
	CMRRSHED	CMRR GO SHED LOADS	NOSHED	
	SSB-SHED	SOC SCI GO SHED LOADS	NOSHED	
	SERFSHED	SERF GO SHED LOADS	NOSHED	
	EMF-SHED	ENV MGMT GO SHED LOADS	NOSHED	
	SHOPSHED	CSC SHOPS GO SHED LOADS	NOSHED	

Typical Fan Speed – Daily Cycle

Demand Response Data

	3PM to 4PM
■ 10 Day Adjusted Average Usage	6.682
■ Curtailment Day Usage	4.868
■ Targeted Curtailment	1.500
■ Achieved Curtailment	1.814

Acknowledgements of Team

- **UCSD Facilities Management**
  - Robert Austin, EMS Administrator
  - Tony Hodgins, Controls Supervisors
  - Gerry Pradarelli, HVAC Technician
  - Greg Bridger, HVAC Technician
- **UCSD FD&C**
  - Gerry White, Director of Engineering
- **Johnson Controls Inc.**
  - Dan Kreitz
  - Walter Richardson

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