



THE UNIVERSITY OF TEXAS
MDAnderson
Cancer Center
Making Cancer History®

Energy Management Journey

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and Prevention Facilities

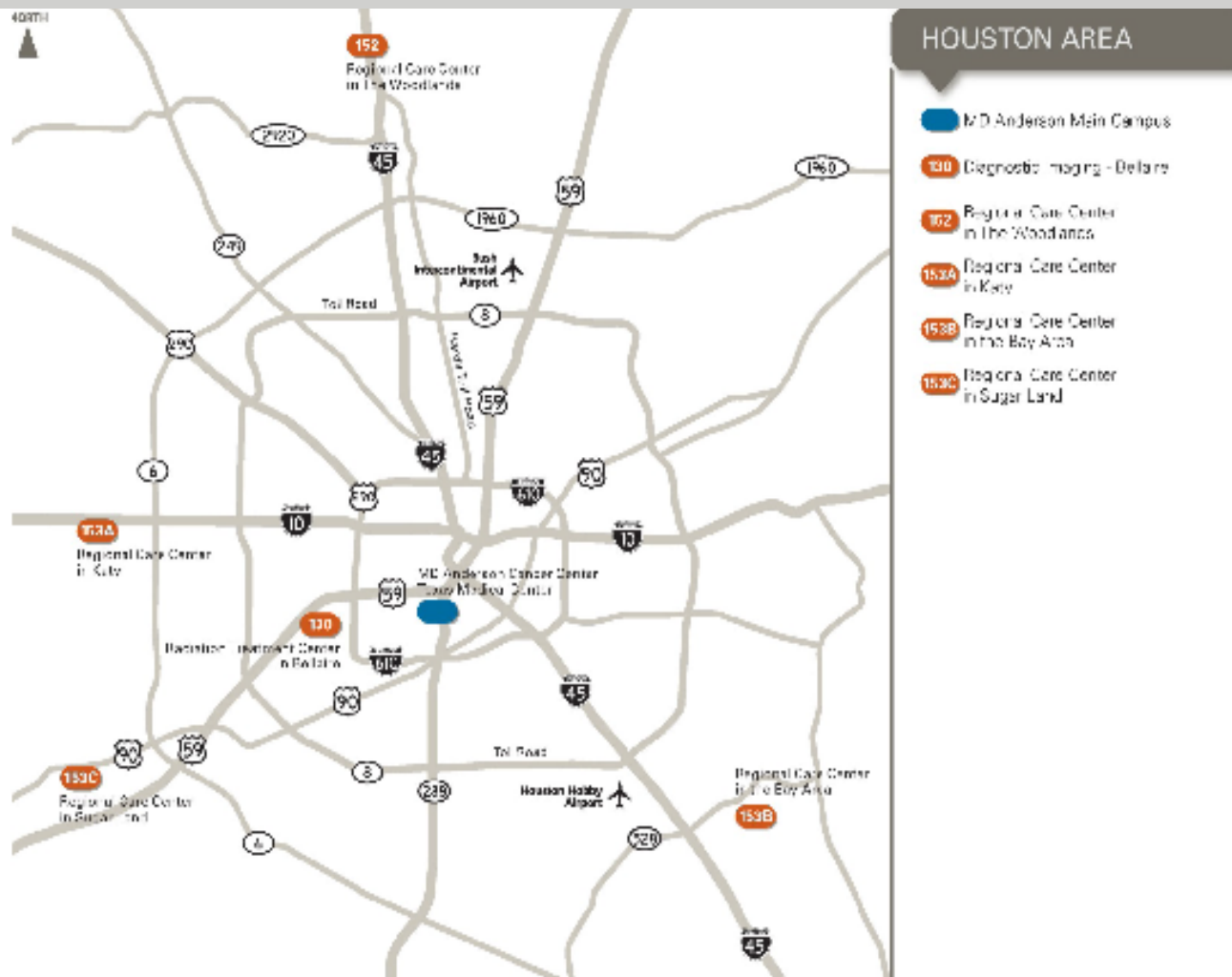
THE UNIVERSITY OF TEXAS

MD Anderson Cancer Center

Making Cancer History®



Patient Treatment



Research Facilities

Research Overview

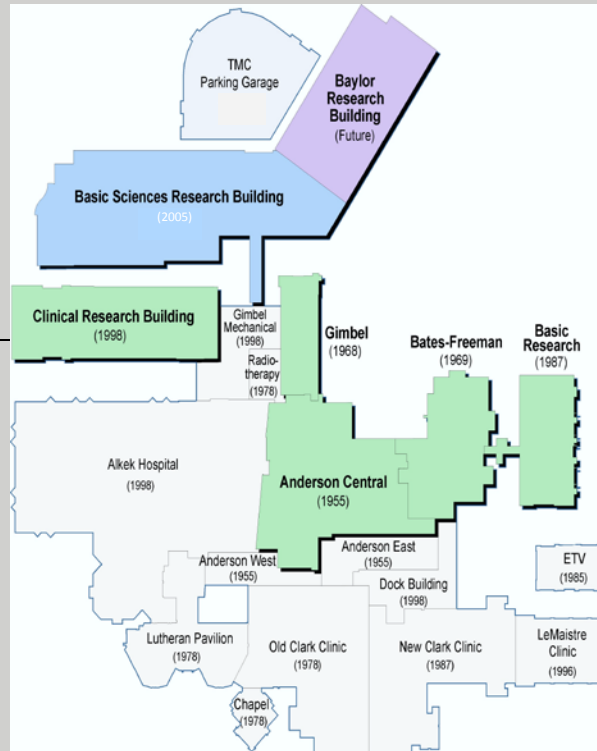


**Science Park
Bastrop**



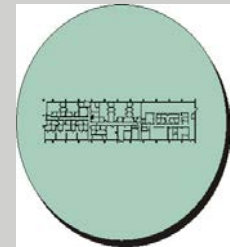
**Science Park
Smithville**

120 MI

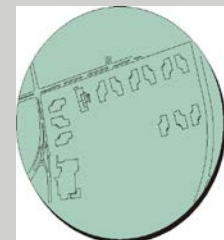


Main Complex

1.5 MI



**Leased
Research Facilities**



South Campus

Master Plan Scenarios



SCENARIO 1

- A. Maintain Bates-Freeman, Jones BRB & Anderson Central
 - Upgrade & repair infrastructure as possible
- B. Maintain Smithville Site
 - Replace Labs 1 & 2
 - Site upgrades as required
- C. Zayed

Why are Engineers so Dull?



“Utter Social Ineptitude”

FCC FORM 680
AUGUST 1963

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D. C. 20554

Not Transferable

AMATEUR RADIO LICENSE

OPERATOR PRIVILEGES: GENERAL
CALL SIGN : WA5LWX
EFFECTIVE DATE: 02-02-65 EXPIRATION DATE: 02-02-70

ARNOLD J GRANGER
ROUTE 2 BOX 280
LAKE CHARLES LA 70662

STATION LOCATION: SAME AS ABOVE

REMOTE CONTROL LOCATION: NONE

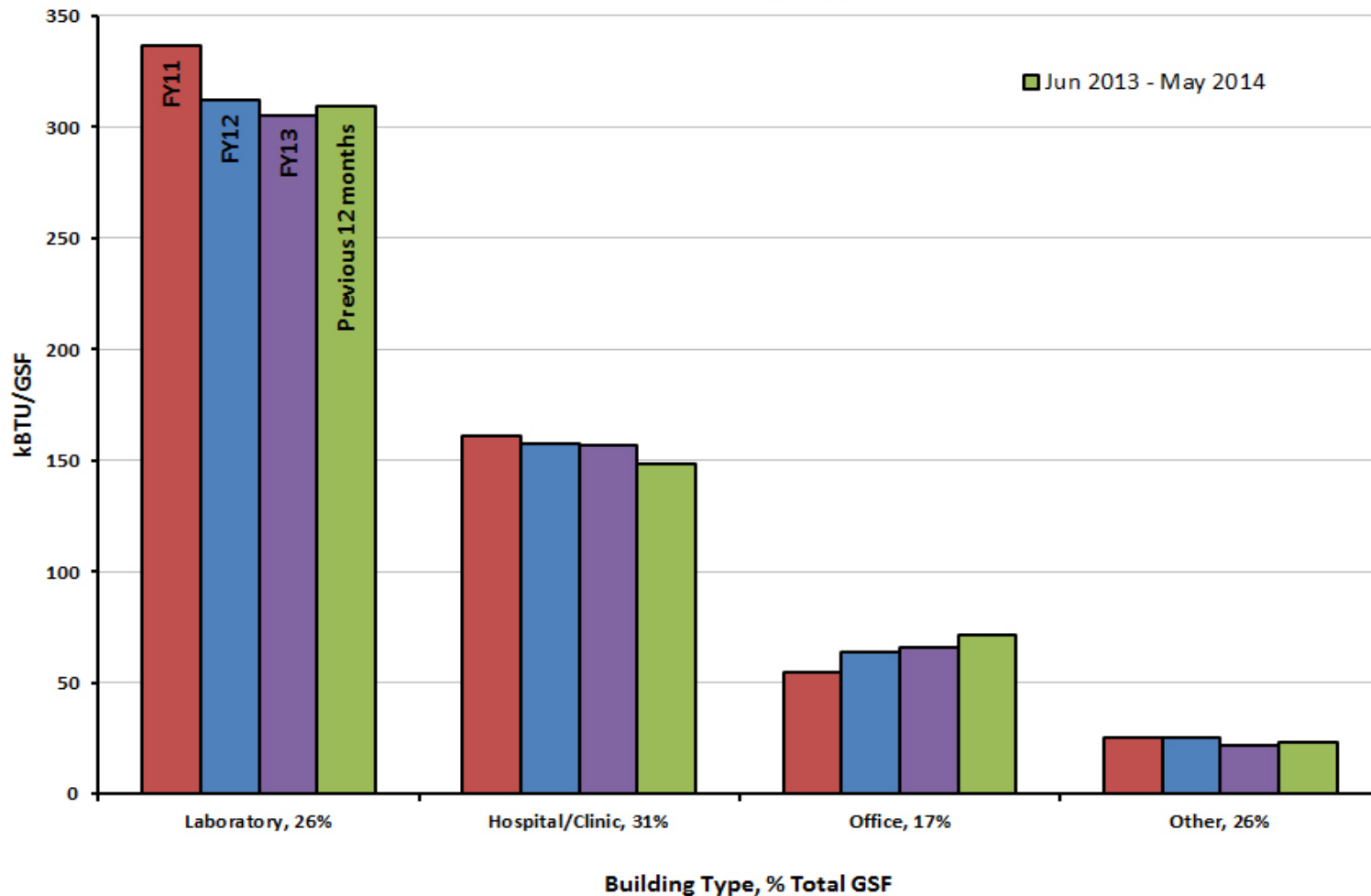
Arnold J. Granger
(Licensee's Countersignature)

Bon F. Wepf
SECRETARY

THIS LICENSE ISSUED SUBJECT TO CONDITIONS ON REVERSE SIDE

Total 15.5M Gross SF

MD Anderson Energy Use Metrics,
by Building Type



Utility Consumption

12 Months

ALL UTILITIES BY UTILITY TYPE -- Jun 2013 - May 2014

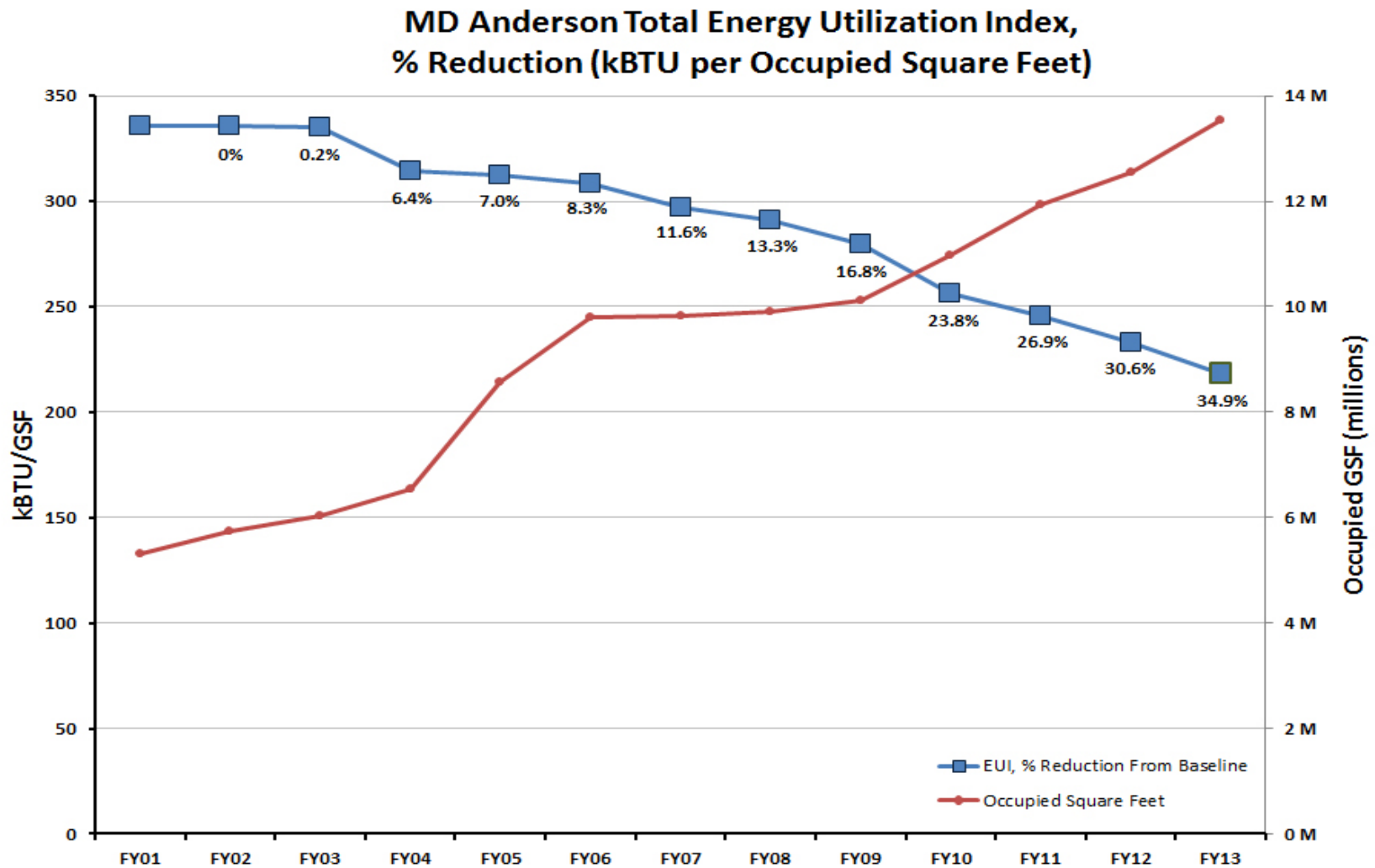
Utility	Cost		Usage		Rate	Units
Electricity		\$19,595,925		300,075,689		KWH
Chilled Water		\$23,081,435		95,332,315		TON-HR
Steam		\$4,879,221		242,858,444		LBS
Natural Gas		\$1,810,305		337,555		MCF
Water		\$1,193,877		275,734,745		GAL
Sewer		\$1,475,047		261,080,304		GAL
Irrigation		\$199,012		27,424,574		GAL
TOTAL		\$52,234,822				

Icon key: Comparison to 12-month period prior to report (Jun 2012 - May 2013)

 *value <2%*

 *value >2%*

EUI and Occupied SF



5 Year Strategic Plan

2013

**Facilities
Management**

Energy and Sustainability
Steering Committee



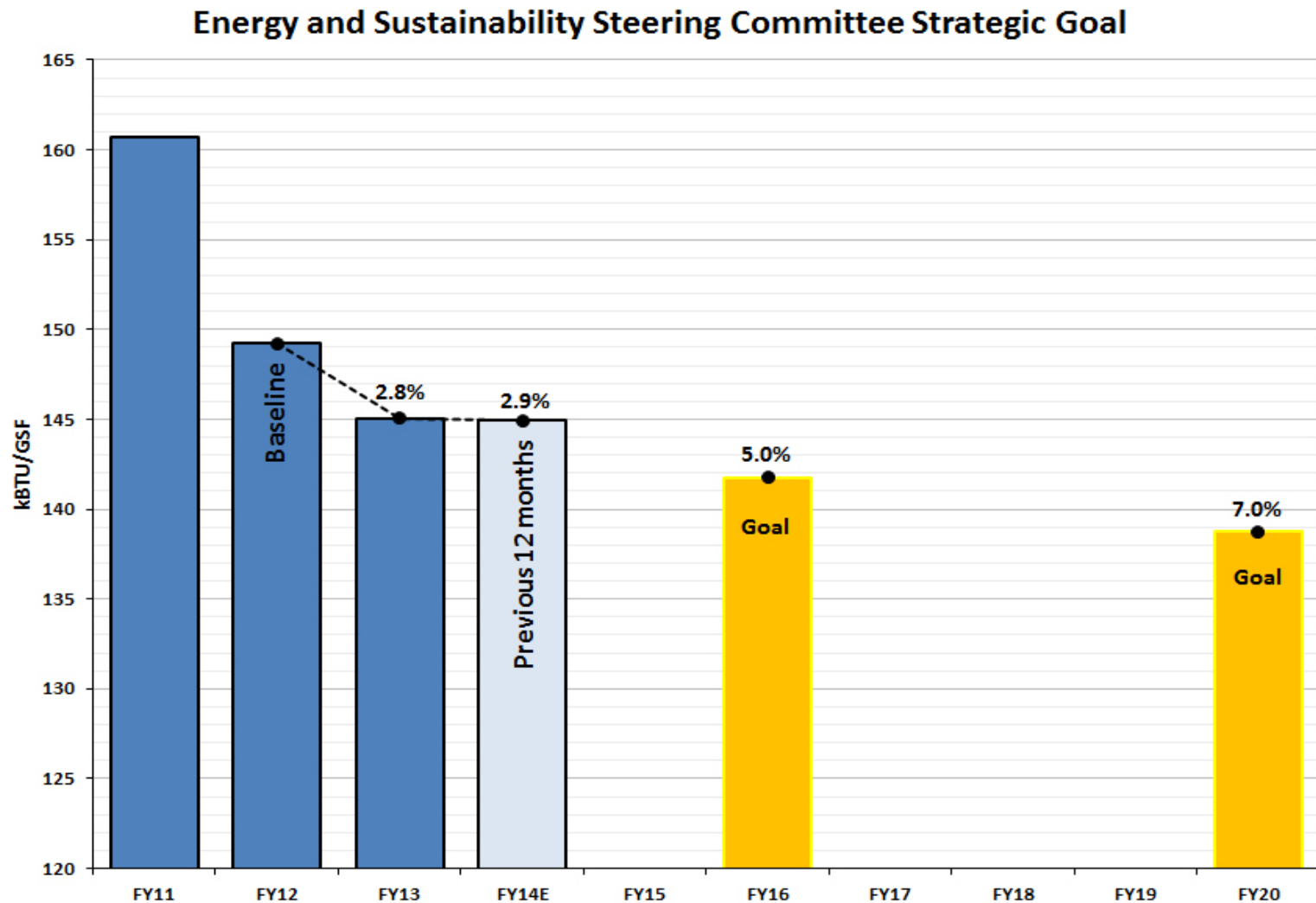
ENERGY AND SUSTAINABILITY STRATEGIC PLAN

MD Anderson's roadmap for proactive execution of utility and waste reduction opportunities.

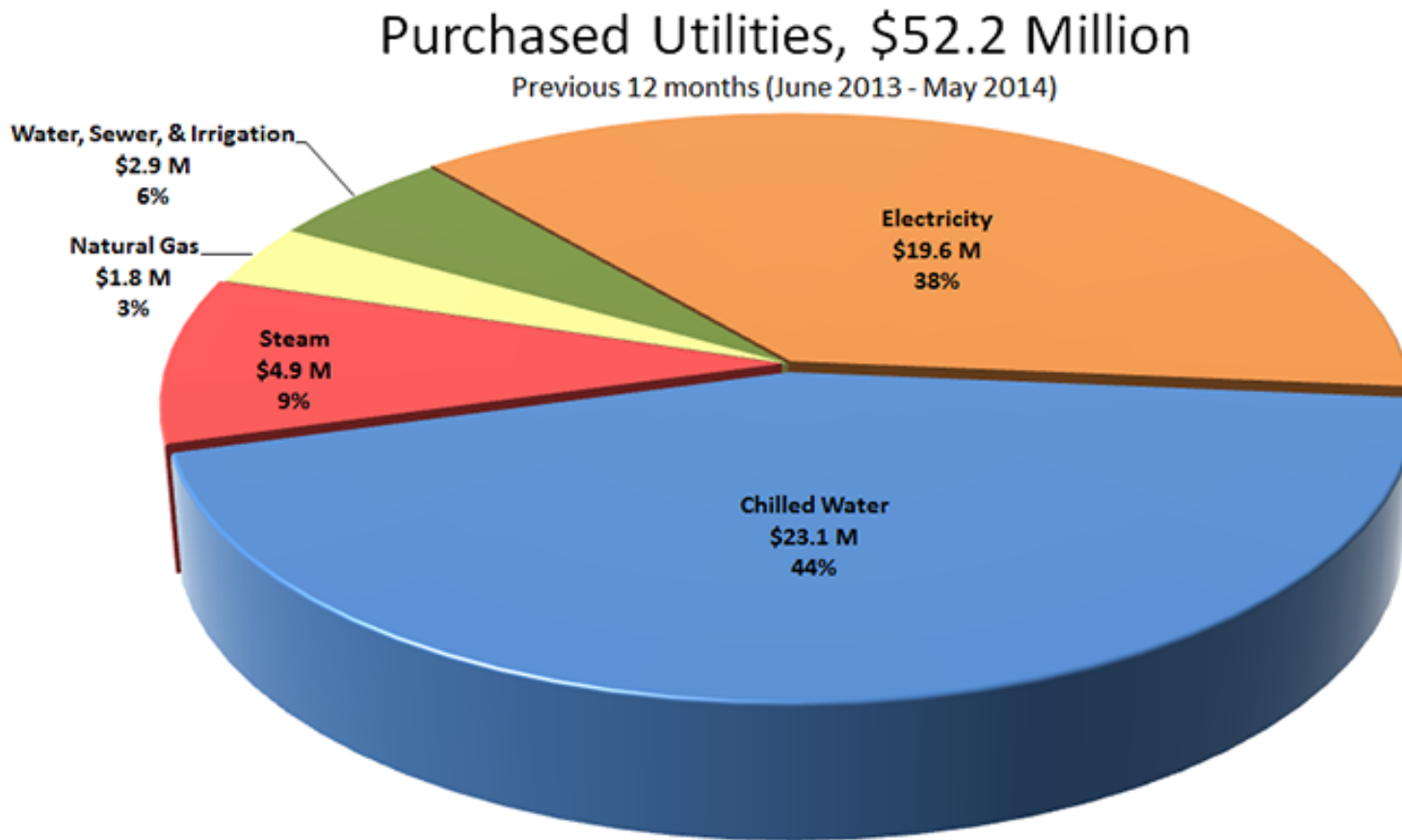
Strategic Goals

- **Reduce FY2016 annual energy consumption in BTU/GSF for occupied space by 5% against FY2012 baseline; and reach a total of 7% by the end of FY2020**
- **Design new buildings to meet or exceed LEED Silver standards; energy efficiency initiatives that meet a minimum 20% return on investment will be considered**
- **Increase annual pounds of solid waste recycling based on FY2013 baseline to 25% of total waste by FY2015**

Energy Reduction Goal



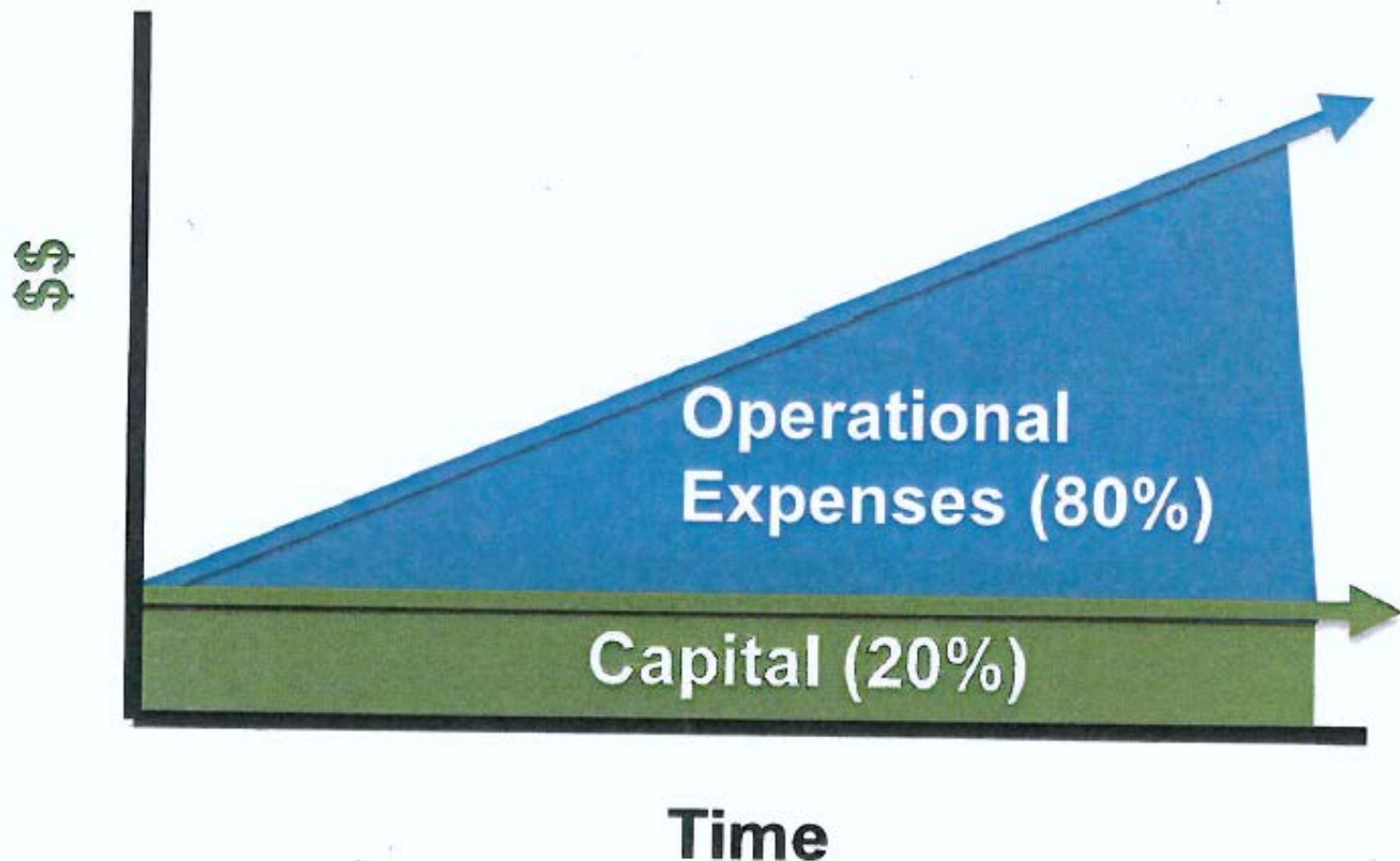
HVAC Largest User

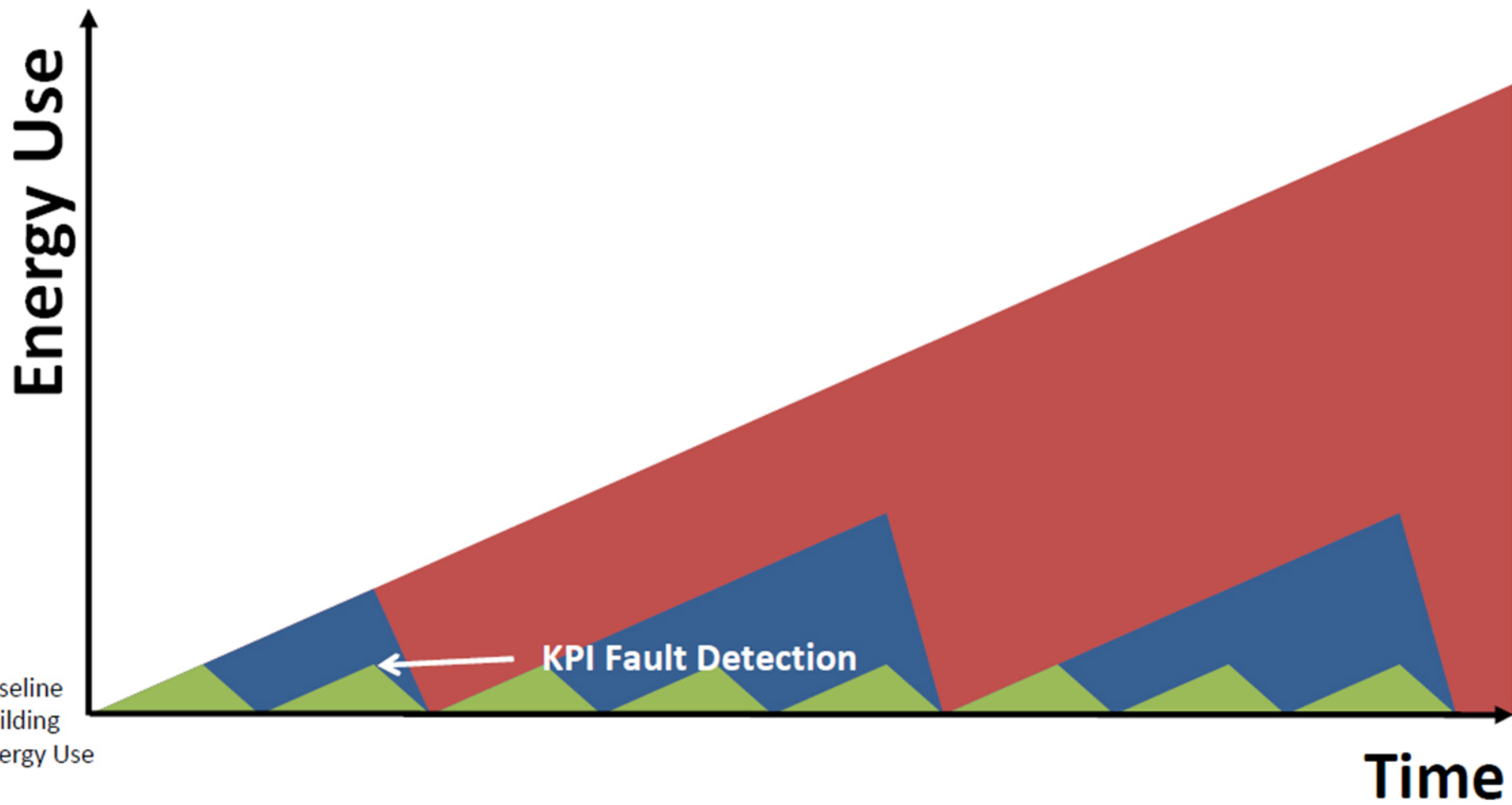


75% Heating, Ventilation, and Air Conditioning
15% Plug Load (imaging, computers, refrigeration, copiers)
10% Lighting

Impact of Efficient Operation

Life Cycle Costs of Assets





KPI PRIORITY

Priority Energy Fault Detection Report - BSRB

Daily KPI report for DAY, DATE

>> PRIORITY 01: OUTSIDE AIR HANDLING UNITS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 159			
01	PHC	16	01	CC	16	01	SAT	16	01	PHC	16	01	PHT	16	01	HUMID	4	01	SF SP	16							
01	+CC		03	OPER		05	LOW		07	OPER		09	CNTL		11	CNTL		13	CNTL								
			01	SAT	16	01	HWC	16	01	PHV	1	01	HUMID	4	01	SF SP	2	01	SF VFD	20							
			04	OPER		06	OPER		08	LEAK		10	OPER		12	OPER		14	OPER								
>> PRIORITY 02: RECIRCULATED AIR HANDLING UNITS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 42			
02	PHC	3	02	CC	3	02	SAT	3	02	PHC	3	02	PHT	3		02	SF SP	3	02	RF SP	2	02	RF VFD	3			
02	+CC		03	OPER		05	LOW		07	OPER		09	CNTL			13	CNTL		15	OPER		17	OPER				
02	HIGH	3	02	SAT	3	02	HWC	3	02	PHV	3				02	SF SP	2	02	SF VFD	3	02	RF SP	2				
02	OA		04	OPER		06	OPER		08	LEAK					12	OPER		14	OPER		16	CNTL					
>> PRIORITY 06: CHWS PUMPS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 19			
06	PMP DP	4	06	PMP DP	2	06	VFD OPER	8		06	BYP VLV	3	06	BYP DP	2												
01	CNTL		02	OPER		03				05	OPER		06	OPER													
>> PRIORITY 07: HHW PUMPS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 7			
07	PMP DP	3	07	PMP DP	1	07	VFD OPER	3																			
01	CNTL		02	OPER		03																					
>> PRIORITY 09: FAN COIL UNITS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 328			
09	PHC	6	09	DAY.NGT	40	09	CLG OPER	42	09	HTG	6	09	SP STPT	116	09	SP OUT	38	09	CLG OUT	36	09	HTG OUT	4	09	RM TEMP		
01	+CC		02	OPER		03			04	OPER		05	OPER		06	OPER		07	OPER		08	OPER		10	OPER		
>> PRIORITY 10: EXHAUST FANS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 83			
10	VFD	28	10	OA DAMP	18	10	FAN SP	6	10	FAN SP	6	10	DPR	25													
01	OPER		02	OPER		03	CNTL		04	OPER		05	OPER														
>> PRIORITY 11: CHILLED WATER HEAT EXCHANGERS INCLUDING PROCESS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 1			
										11	LOW	1						PULSE	Avg CHW dT	PULSE	Peak tons	PULSE	Total ton-hrs				
										05	DT								22.0		2,551		52,886				
>> PRIORITY 12: HEATING HOT WATER HEAT EXCHANGERS (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 12			
12	STM VLV	4				12	HWST	4	12	HWST	4							PULSE	Peak Stm PPH	PULSE	Total Stm Lbs	PULSE	Peak HHW MBH	PULSE	Total HHW Mbtu		
01	OPER					03	OPER		04	CNTL									14,674		203,001		6,205		94,594		
>> PRIORITY 14: AIR TERMINAL UNITS INCLUDING OUTSIDE AIR BOXES (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 3986			
			14	OCC	154	14	RVA	93	14	VLV	443	14	SP OUT	458	14	MINMAX	500	14	CLG OUT	345	14	SUP FLO	58				
			03	OPER		05	OPER		07	OPER		09	OPER		11	FLO OPER		13	OPER		15	OPER					
14	DAY.NGT	362	14	DMPR	337	14	AOV3	17							14	FLO STPT	283	14	HTG OUT	401	14	EXH FLO	58	14	RM TEMP		
02	OPER		04	OPER		06	OPER								12	OPER		14	OPER		16	OPER		18	OPER		
>> PRIORITY 15: PHOENIX AIR VALVES (WHEN "ON")																								TOTAL SYSTEM KPI FAULTS DETECTED = 2092			
15	JAM	586	15	SPA	586	15	OCC BN08	239				15	OCC MIN	227				15	UNOCC	227			15	OFFSET	227		
01	ALARM		02	ALARM		03						06	BN08					08	MIN BN08			10	BN08				
>> PRIORITY 16: PANEL FAILURES AND POINT STATUS FLAGS																								TOTAL SYSTEM KPI FAULTS DETECTED = 1228			
16	PANEL	1	16	*A3*	1	16	*A6*	222	16	POINTS	500	16	OUT OF	1	16	MANUAL	1	16	PGM	1	16	OPER/	501				
01	FAILED		02	ALARM		03	ALARM		04	FAILED		05	SERV		06	DISABLE		07	DISABLE		08	BN08		TOTAL	KPI Faults		
																								7,957			

Printed Date Time

<http://fm/fminitatives/energy/projects/lab/REFmain/Shared%20Documents/KPI-BSRB/BSRB Analysis--report.xlsm>

Priority Energy Fault Detection Report - BSRB

Daily KPI report for Wednesday, November 05, 2014

>> PRIORITY 01: OUTSIDE AIR HANDLING UNITS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 4	
						<u>01</u> <u>13</u>	SF SP CNTL	2			
			<u>01</u> <u>08</u>	PHV LEAK	2						
>> PRIORITY 02: RECIRCULATED AIR HANDLING UNITS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
>> PRIORITY 06: CHWS PUMPS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
>> PRIORITY 07: HHW PUMPS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
>> PRIORITY 09: FAN COIL UNITS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 22	
					<u>09</u> <u>05</u>	SP STPT OPER	8	<u>09</u> <u>06</u>	SP OUT OPER	14	
>> PRIORITY 10: EXHAUST FANS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
>> PRIORITY 11: CHILLED WATER HEAT EXCHANGERS INCLUDING PROCESS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
								PULSE	Avg CHW dT 19.5	PULSE	Peak tons 2,350
										PULSE	Total ton-hrs 47,478
>> PRIORITY 12: HEATING HOT WATER HEAT EXCHANGERS (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 0	
								PULSE	Peak Stm PPH 15,927	PULSE	Total Stm Lbs 218,503
										PULSE	Peak HHW MBH 11,381
										PULSE	Total HHW Mbtu 98,530
>> PRIORITY 14: AIR TERMINAL UNITS INCLUDING OUTSIDE AIR BOXES (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 175	
			<u>14</u> <u>07</u>	VLV OPER	118	<u>14</u> <u>09</u>	SP OUT OPER	45			
	<u>14</u> <u>04</u>	DMPR OPER	3			<u>14</u> <u>12</u>	FLO STPT OPER	1	<u>14</u> <u>14</u>	HTG OUT OPER	7
									<u>14</u> <u>18</u>	RM TEMP OPER	1
>> PRIORITY 15: PHOENIX AIR VALVES (WHEN "ON")										TOTAL SYSTEM KPI FAULTS DETECTED = 33	
<u>15</u> <u>01</u>	JAM ALARM	1	<u>15</u> <u>02</u>	SPA ALARM	32						
>> PRIORITY 16: PANEL FAILURES AND POINT STATUS FLAGS										TOTAL SYSTEM KPI FAULTS DETECTED = 434	
<u>16</u> <u>01</u>	PANEL FAILED	1	<u>16</u> <u>02</u>	*A3* ALARM	46	<u>16</u> <u>04</u>	POINTS FAILED	114	<u>16</u> <u>06</u>	MANUAL DISABLE	2
									<u>16</u> <u>08</u>	OPER/ BN08	271
										TOTAL	KPI Faults 668

Printed 11/5/2014 8:35 AM

<http://fm/fminitatives/energy/projects/lab/REFmain/Shared%20Documents/KPI-BSRB/BSRB Analysis-report.xlsx>

#	ABBRV	KPI DESCRIPTION	RECOMMENDED ACTION
PRIORITY 01: OUTSIDE AIR HANDLING UNITS (WHEN "ON")			
01 07	PHC OPER	Preheat air discharge temperature setpoint(s) on "OPER" priority	-check the point memo through "Commander" of each shown point for the following: A) if the memo has no text then relinquish the associated point from "OPER" priority and then done. B) if the memo has text and current date shown on point memo exceed expected end date(s), then inquire when updated expected end date and then change point memo(s) text accordingly.
01 08	PHV LEAK	Preheat discharge air temperature(s) 3°F higher than OA temperature when valve is closed	'for each shown point, confirm fault at stated condition by reviewing appropriate AHU graphic(s); if there is/are still fault(s): A) if the "HWC OPER" fault for associated preheat coil valve command point is causing this fault then perform associated previously shown recommended action accordingly. If its associated actuator command point memo has text, then add appropriate text to point memo of associated PHT point to indicate issue with the valve/actuator. B) verify that preheat coil valve/actuator is not leaking while closed by field measuring the inlet air temperature and the outlet air temperature; if the outlet is higher than the inlet, then create work order to address valve/actuator issue and add appropriate text to associated point memos of the PHT point and the actuator command point. C) field verify accuracy of Apogee sensor reading with calibrated portable sensor; if Apogee sensor is not accurate, create work order to fix Apogee sensor and insert appropriate text into corresponding point memo.
01 09	PHT CNTL	Preheat air discharge temp 5°F higher than default setpoint for >240 minutes	for each shown point, confirm fault at stated condition by reviewing appropriate AHU graphic(s); if there is/are still fault(s): A) if the "HWC OPER" fault for associated preheat coil valve actuator command point is causing this fault then perform associated previously shown recommended action accordingly. If its associated actuator command point memo has text, then add appropriate text to point memo of associated PHT point to indicate issue with the valve/actuator. B) confirm that the coil valve and its corresponding actuator modulate properly; if not, create work order to address issue and add appropriate text to associated point memos of the PHT point and the actuator command point.
01 10	HUMID OPER	AHU humidifier valve command(s) on "OPER" priority	-check the point memo through "Commander" of each shown point for the following: A) if the memo has no text then relinquish the associated point from "OPER" priority and then done. B) if the memo has text and current date shown on point memo exceed expected end date(s), then inquire when updated expected end date and then change point memo(s) text accordingly.

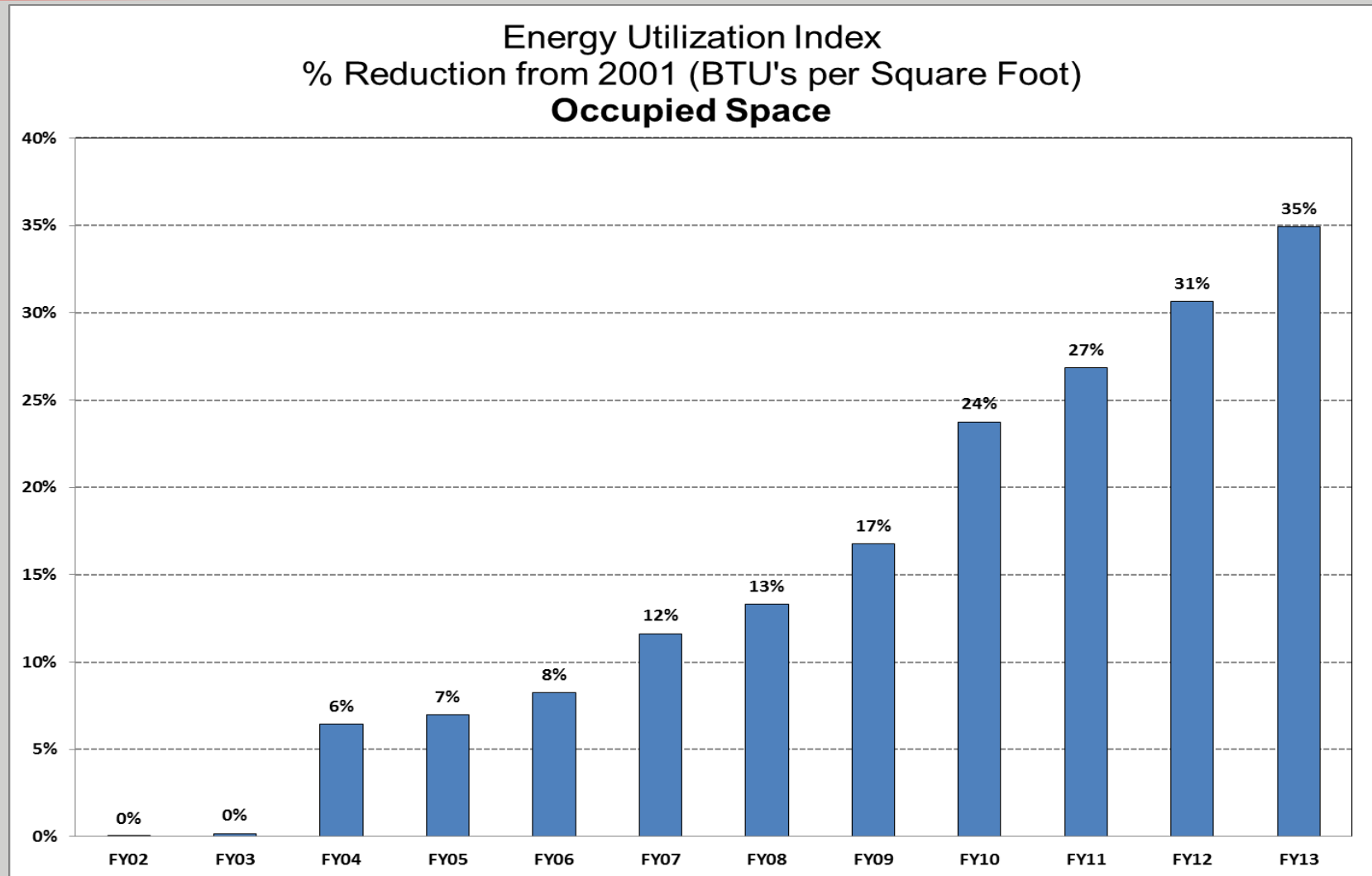
Energy Conservation Measures

- **Outside air optimization**
- **Energy recovery systems**
- **Unoccupied space setbacks**
- **Reduce simultaneous heating & cooling**
- **Demand based temperature resets**
- **High efficiency fume hoods**

Energy Conservation Measures

- **Pumping system optimization**
- **Central plant optimization**
- **Controls optimization-Retro Cx**
- **Lighting occupancy sensors and timers**
- **Low watt T8 lighting standards**
- **LED fixtures for select applications**
- **Benchmarking and sub-metering**

\$17.6 million saved in FY2013 vs. FY2001 baseline performance
Same bottom line benefit as an additional **\$352** million of
patient revenue with 5% margin



Electric Supply and Demand Reduction Programs

- **Aggregated 9 UT institutions to negotiate current retail electric agreement**
 - General Land Office contract in place through December 2016 based upon fixed heat rate and hedged on natural gas
 - UT System initially saved \$15.2M (MDA \$5.1M)
 - \$2.0+M savings in FY14 due to wholesale price management
- **FY14 Demand Response Participation**
 - CenterPoint Energy (6.5 MW)= \$230K rebate
 - ERCOT Program= \$164K rebate

Healthcare Mission Team: Guiding Principle

- **Enhanced Environment of Care**
- **Improved Operations**
- **Reduce Energy Costs**
- **Focus on Demand Side Energy Management**
- **Team Approval on Plans**
- **System Repair and capacity enhancement**
- **Equipment Upgrade**
- **One Stone for Two Birds: Energy and Operations**
- **Minimize Impact to Customers**

Healthcare Mission Team: Guiding Principle

- **Maximize the use of resources**
- **Have accountability for the project implementations**
- **Well-defined timeline**
- **Bigger maintenance, smaller capital**
- **Fast payback**
- **Priority: payback, time sensitivity, constructability**
- **Bi-weekly project update by leader**

Energy Team and Collaboration

- **O&M Team**
- **Energy Management Team**
- **BAS Team**
- **Engineering Team**
- **Construction Team**
- **Executive Leadership / Sponsorship**

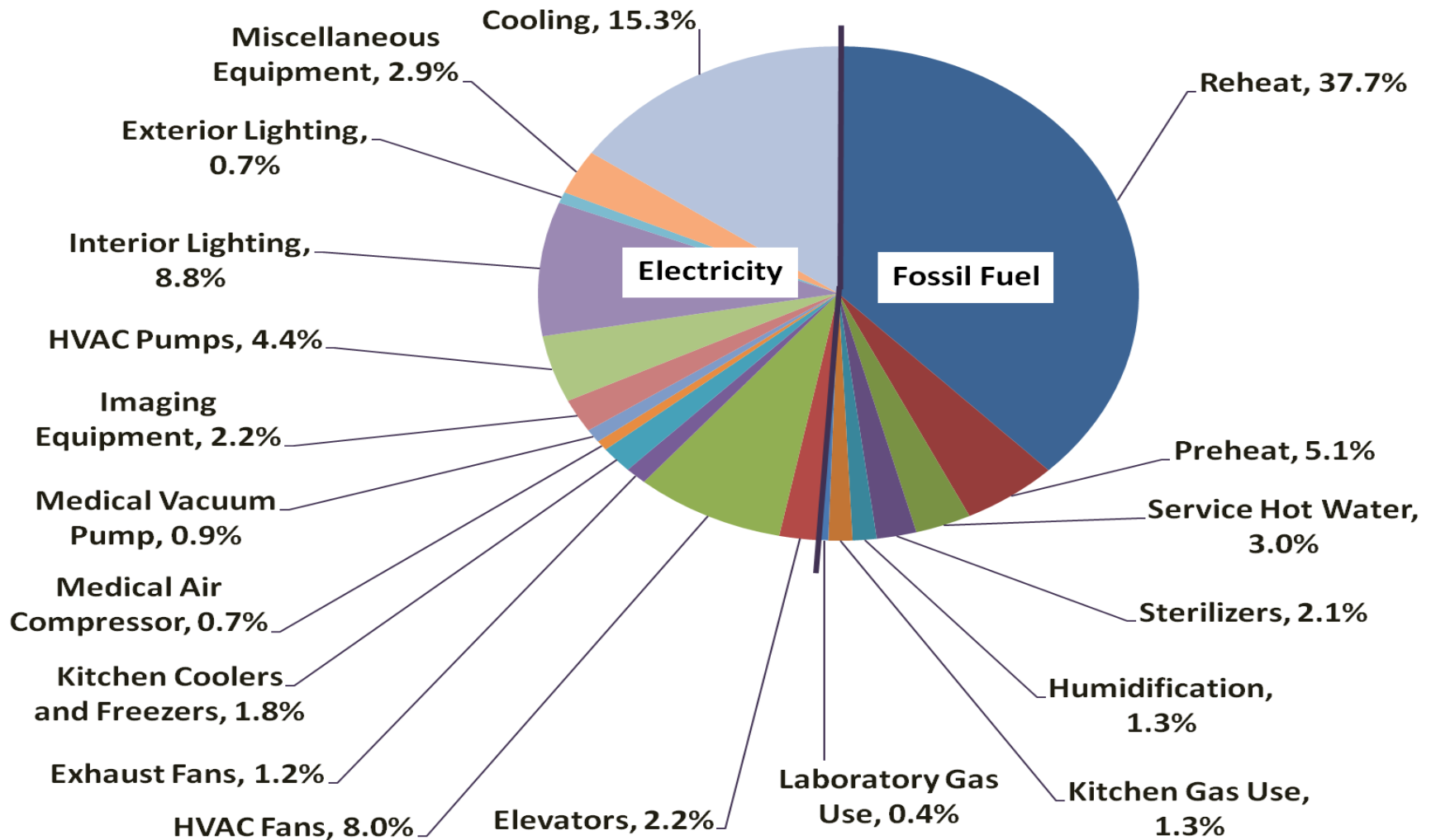
Major Strategy to Reduce Energy Consumption and Sustain High Performance

- **Establish short, medium, and long term projects**
- **Establish 90 days (quarterly) goals**
- **Assign lead with accountability for each goal items**
- **Implement energy ECMs**
- **Establish energy performance dashboard**
- **Monitoring and maintain default set points**
- **Educate frontline employees**
- **Form energy conservation culture**
- **Resolve deficiencies identified through Daily Operation Report (newly established)**

Major Steps

- **Collect design information**
- **Field investigation and Measurement**
- **Analysis of BAS sequence of operations**
- **Draft energy (ECM) measures**
- **Estimate energy and cost savings**
- **Develop new sequence of operations**
- **Install necessary parts**
- **Team approval**
- **Implementations**
- **Fine-tuning and monitoring**

Energy Usage in Healthcare Building (ASHE Cx)



Buildings, Systems and Focus

Select Buildings:

- Clinic (NCC, Love, OCC, LP, CSF, ACB)
- Hospital (Alkek and Lutheran)
- MOB (CPB, FC and PAT)

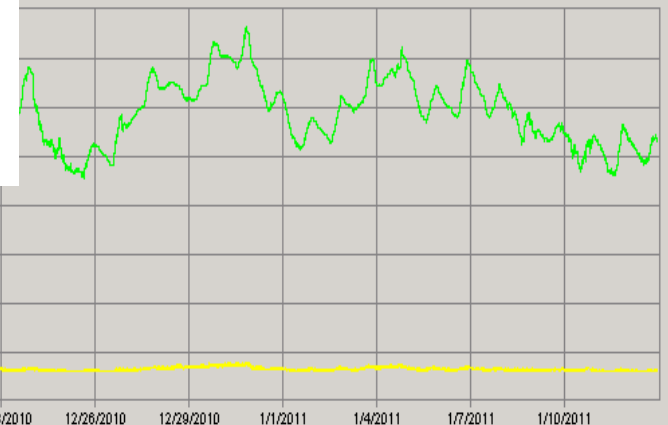
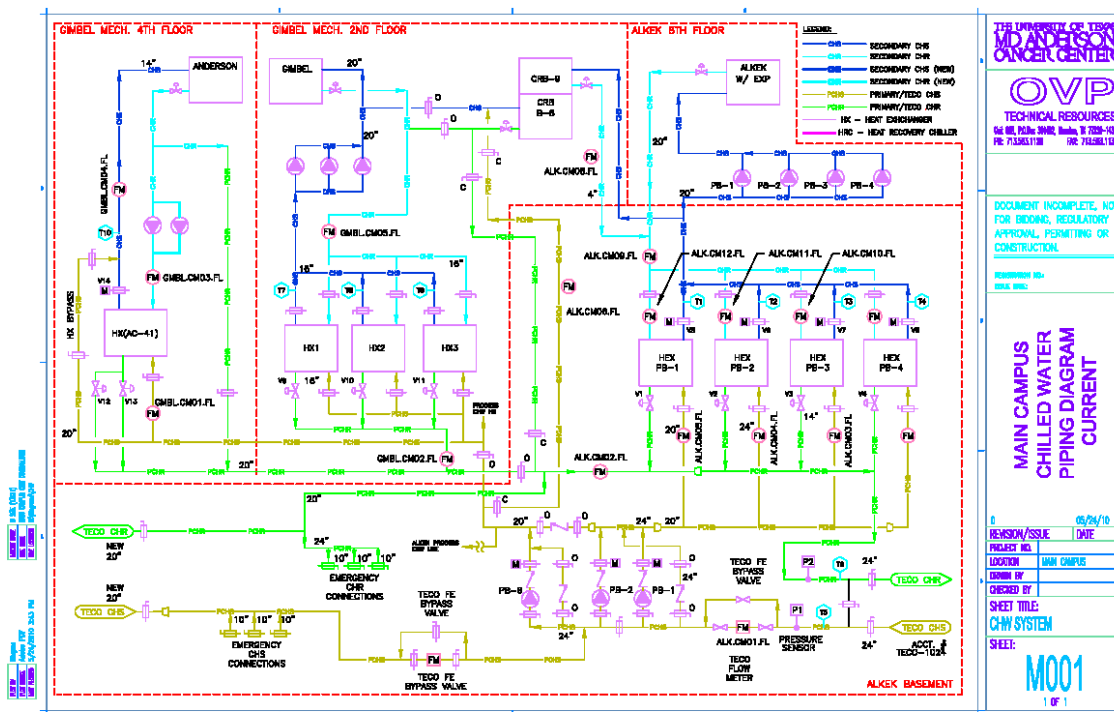
Select Systems:

- Steam, ChW, AHU, OA and Air Distribution

Major Focus:

- Semetouanuus cooling/heating reduction
- HVAC Unoccupied setback
- Optimized outside intake
- Heat Recovery Chiller
- Pumping system optimized control
- Steam system leak reduction
- Power usage reduction
- Use of high efficiency equipment

Implementations, Fine-tuning and Troubleshooting



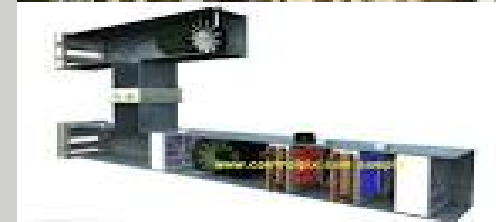
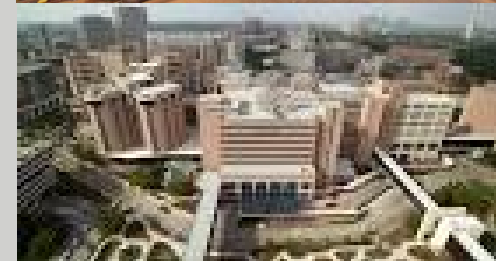
Implementations, Troubleshooting, Sustaining



Patient Care Main Campus Energy Cx

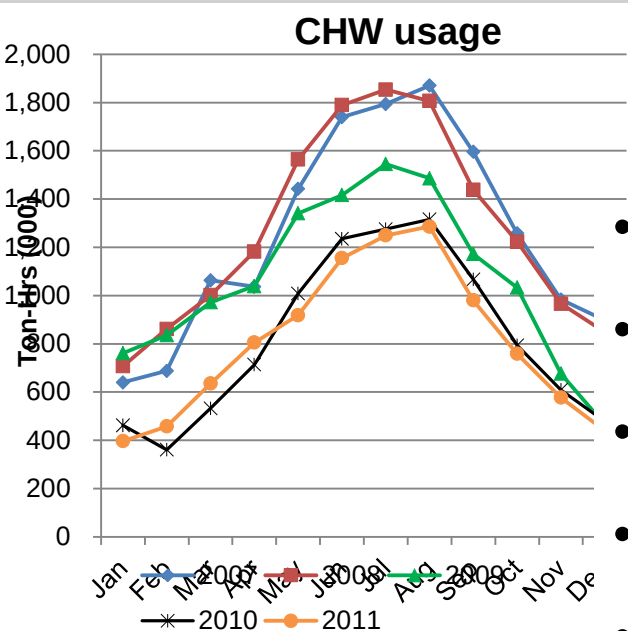
\$4 million annual energy savings -2014 vs: 2008 and 2011

- AHU air temperature dynamic reset
- Heat Recovery chiller
- Sustainability default BAS set points
- ChW pump bypass and optimized control
- Chilled water system ΔT improvements
- Kitchen unoccupied ventilation reduction
- OA temperature optimization
- OA optimization for clinical floors
- Steam system repair
- AHU static pressure control
- HW system control
- Terminal box upgrade
- Effective PM on filters and coils
- System repair



Mays Clinic Retro-commissioning

\$2 million annual energy savings



- Unoccupied airflow reduction
- Cold deck reheat elimination
- Smart fan & pump control algorithms
- Outside air pre-treatment optimization
- Hot & cold deck
- Optimize minimum airflows to reduce simultaneous heat and cooling

ACB Energy Savings Summary

	Electric KWH	Chilled Water Ton-hours	Chilled Water Gallons	Steam Pounds	Total Building
Jan	\$30,169	\$72,191	\$11,088	\$44,311	\$157,759
Feb	\$27,631	\$101,124	\$9,287	\$36,699	\$174,741
Mar	\$32,590	\$116,948	\$8,136	\$43,048	\$200,722
Apr	\$25,815	\$114,785	\$8,384	\$45,127	\$194,111
May	\$25,478	\$169,512	\$7,678	\$47,942	\$250,610
Jun	\$24,583	\$153,663	\$7,224	\$46,218	\$231,688
Jul	\$22,734	\$153,938	\$9,402	\$46,707	\$232,781
Aug	\$29,462	\$137,311	\$17,879	\$36,688	\$221,340
Sep	\$28,535	\$216,739	\$5,039	\$38,866	\$289,179
Oct	\$19,029	\$164,832	\$7,701	\$46,576	\$238,138
Nov	\$29,249	\$107,925	\$15,482	\$41,720	\$194,376
Dec	\$30,019	\$99,620	\$17,263	\$43,729	\$190,631
Total	\$325,294	\$1,608,58	\$124,562	\$517,631	\$2,576,074

Research Facilities Energy Conservation

Major Initiatives - \$3~4 million annual energy savings

- **Changed laboratory minimum required air change rate from 12 ACH continuously to 6 ACH occupied and 4 ACH unoccupied**
- **Developed lab re-cool in high heat load areas instead of cooling with 100% outside air**
- **Fume hoods**
 - **Close the sash campaign**
 - **Rebalance airflow**
 - **New hood standards / proximity sensors**
- **Retro-commission laboratory and Vivarium HVAC and exhaust systems to new standards**
- **Central plant optimized operations**

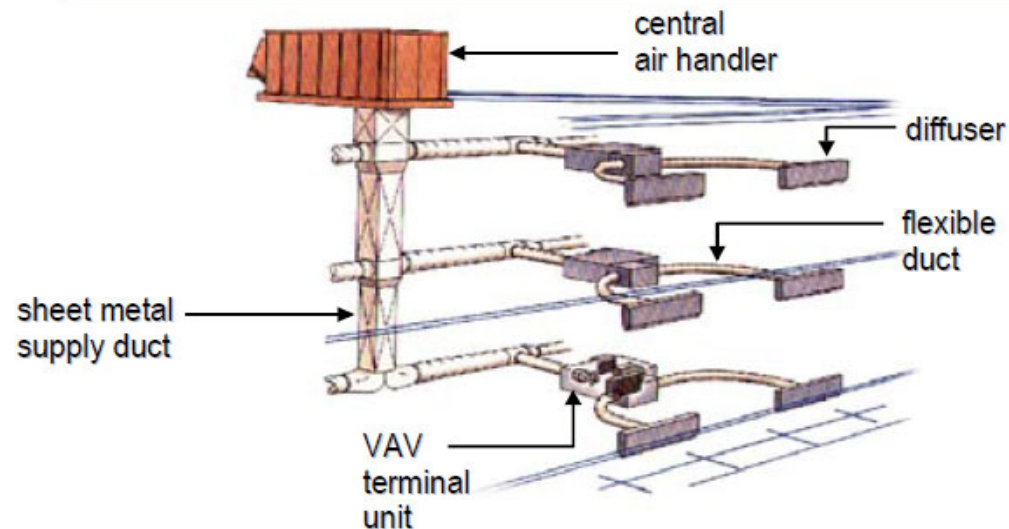
Innovative Energy Solutions for Healthcare Buildings (two examples)

- **Dynamic Air Temperature Demand Reset for AHUs**
- **OR Energy Conservation**

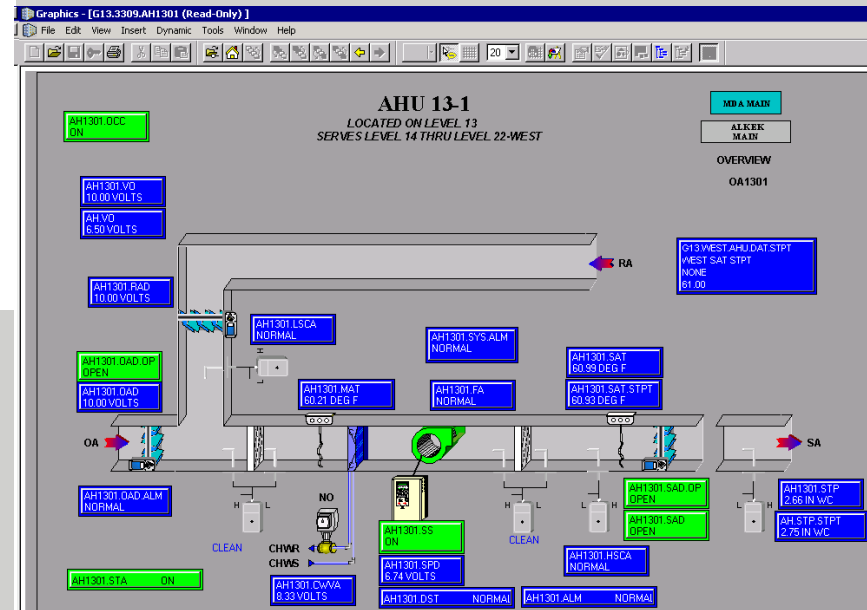
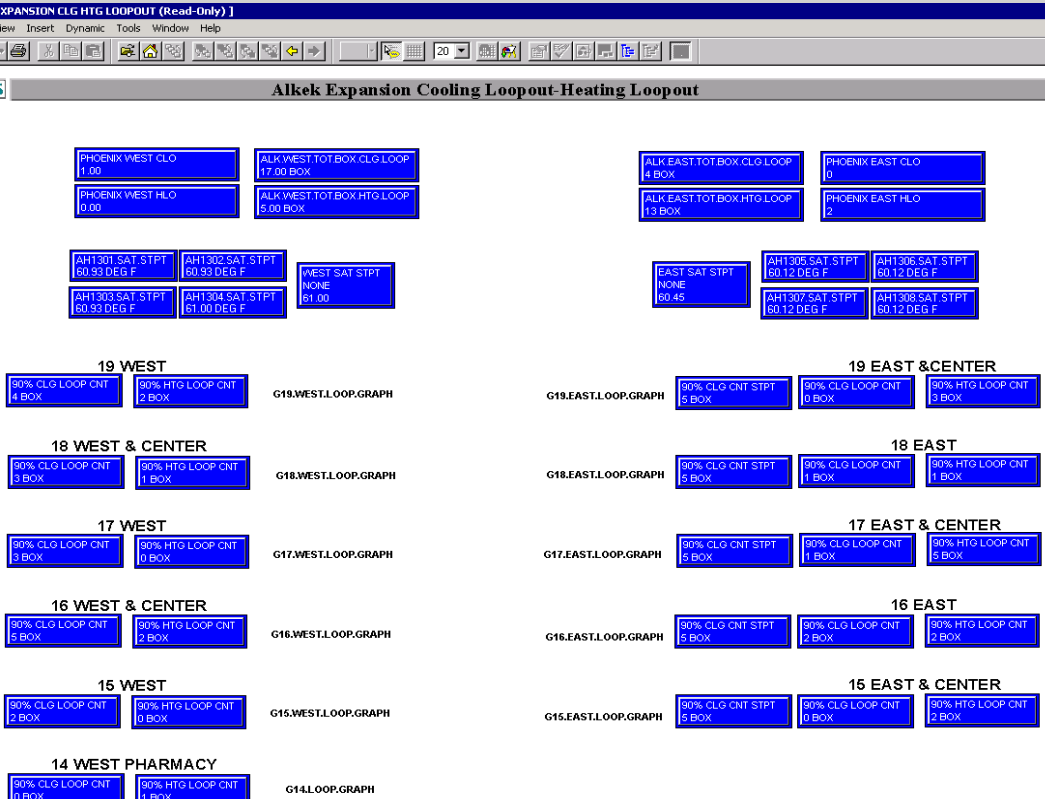
Dynamic Air Temperature Demand Reset for AHUs

- Reduce simultaneous cooling/heating
- Count and monitor the deck temperature and terminal box operations
- Reset supply air temperature based on the total # of terminal box loop output with over 90%
- Dynamic reset
- Lower/Higher limit

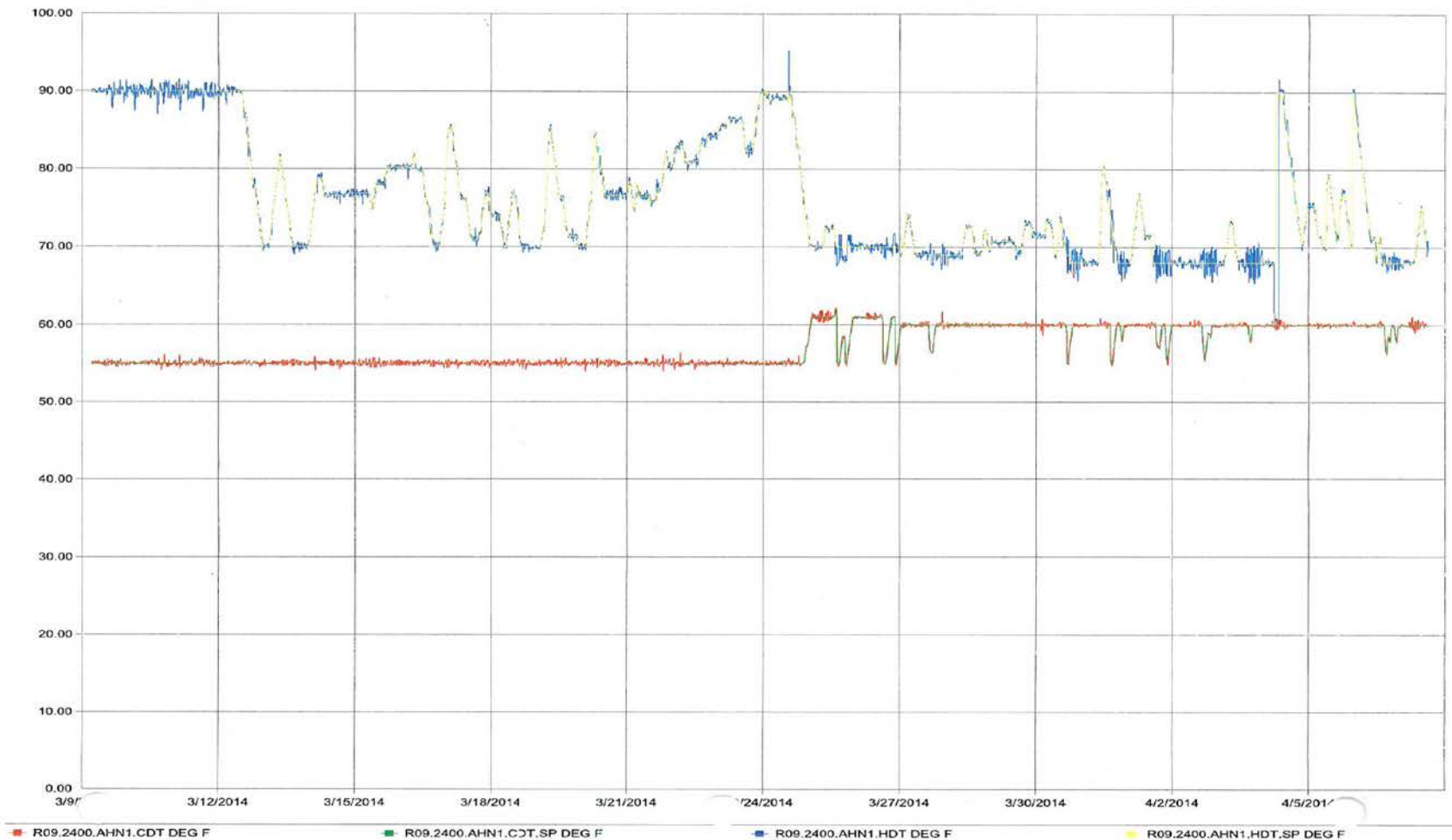
Supply Duct System



AHU and Terminal Box (Conditioned Space)



Dynamic Air Temperature Demand Reset for AHUs



OR Energy Conservation

Goal: Maintain OR EOC and Reduce Energy Costs During Unoccupied Hours

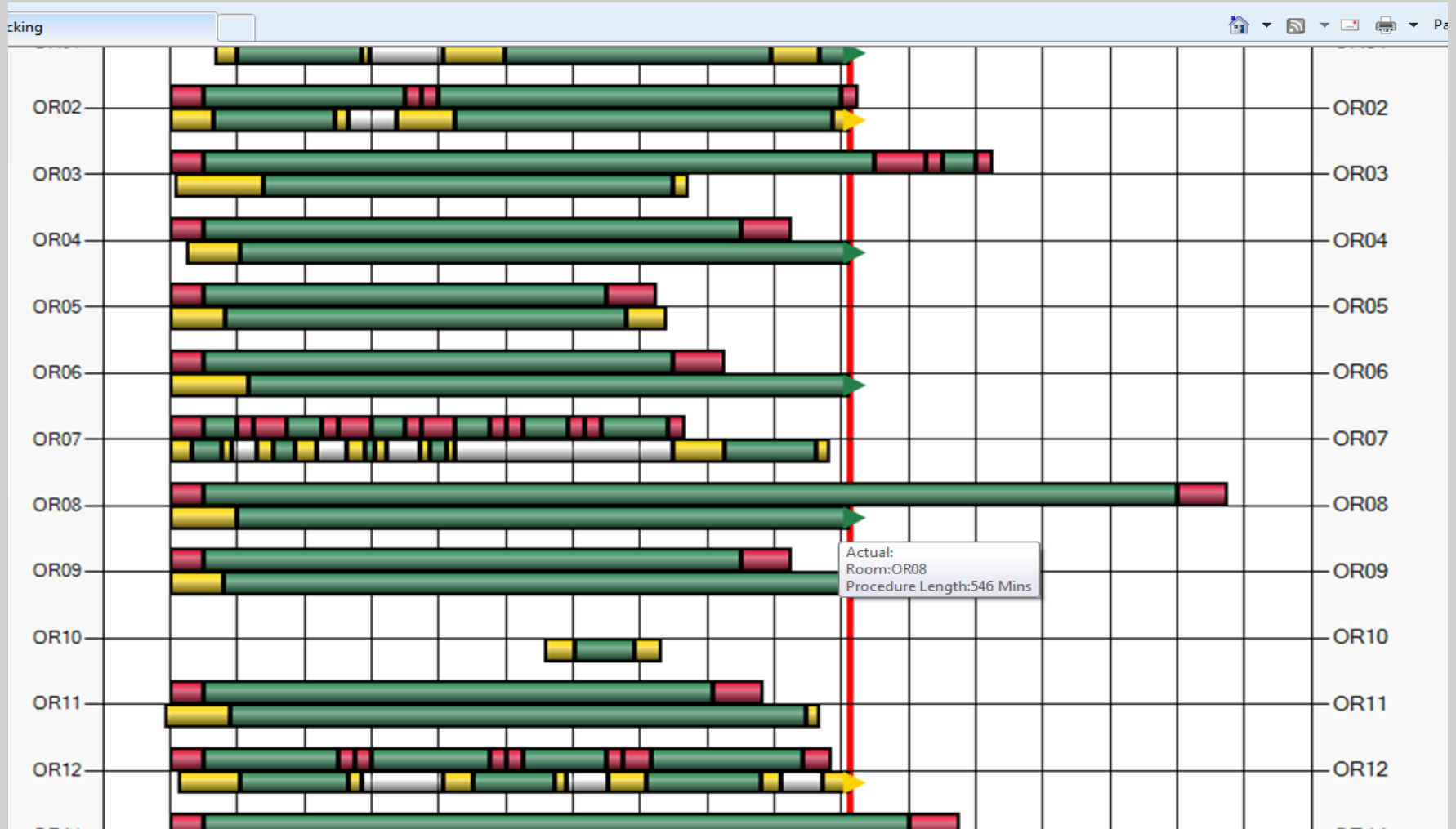
- Team with OR clinical and IT team
- Maintain 68-75F for the OR rooms with RH level of 20-60%
- Maintain the same Delta P for the OR room pressurization
- Maintain pressure compliance, protect the sterile supply, and avoid additional terminal cleaning
- Reduce energy consumption
- Provide emergency override
- Maintain 24/7 operations for pre-defined OR rooms



OR Energy Conservation Scheme

- Following actual surgical schedules on individual basis
- Differential pressure: Same as Occupied – relies on Δ CFM (dashboard)
- Unoccupied Room ACH: 8~10
- Reset between occupied and unoccupied per the surgical schedule
- Maintain lower temperature (68F or so) to reduce terminal reheat
- Verify DP by measurement

OR Energy Conservation



High Performance Sustainability

- **Establish the default set points**
- **Build dashboard**
- **Daily monitoring**
- **Resolve override and problems**
- **Educate O&M staff and form energy culture**
- **Clear roles and responsibility**
- **Newly established daily deficiency report for O&M action**

High Performance Sustainability

AHU#	Location	Previous Pre Heat STPT	New Pre Heat STPT	Previous Cooling STPT	New Cooling STPT	Previous SAT STPT	New SAT STPT	Serves	Asset #	Building
OAHU CB-N1	RB.2564	45	45	55	55			CB-N2, CB-N3, CB-N4, CB-N5, CB-N6, CB-S1, CB-S2	16917	100J
OAHU-OC1	RB.1626	48	45	55	55				13165	100S
OAHU-OC2	RB.1626	48	45	55	55				13167	100S
OAHU-OC3	RB.1626	57	45	55	55				13170	100S
AHU OC6	RB.1626	48	45	54	55				13173	100W
OAHU CS-B3	RB.1000	45	45	55	55				50221	100P
OAHU CS-B4	RB.1000	45	45	55	55				50222	100P
AHU C4-N3	R5.2352				55	55	55	OUTPATIENT SURGERY OPERATING ROOMS	15814	100J
OAHU CS-P4	R12.1100	45	45	55	55				50028	100P
OAHU CS-P3	R12.1100	45	45	55	55				50026	100P
OAHU L-3-1	P3.2900	52	45	55	55				75612	100K

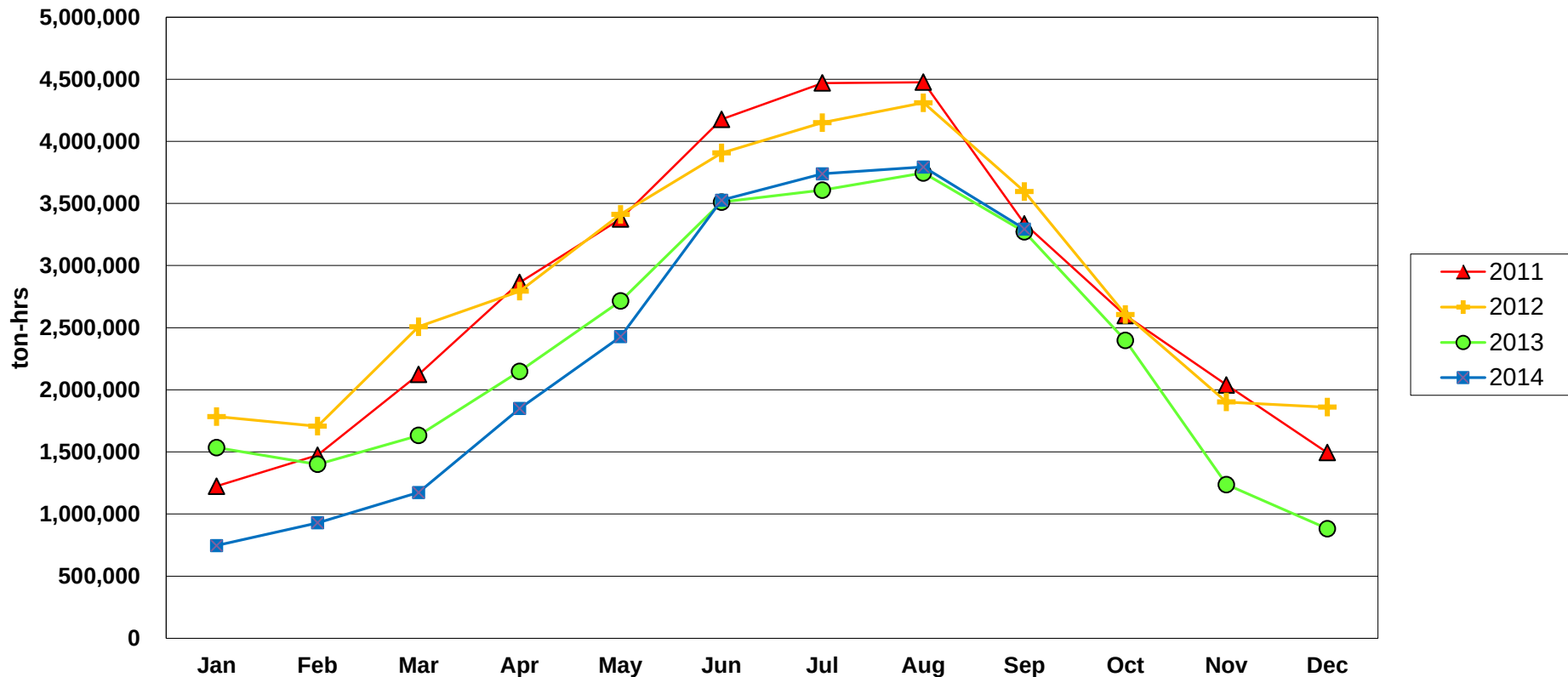
LUTHERAN DEFAULT SET POINTS PAGE 1										
LUTHERAN AIR HANDLERS										
Point Name	Description	Program Setpoint	Setpoint	Air Handler	Location	Area Served	AHU Type	Outside Air	VFD	Trend G
P16.3167 AH01 RAT	RT Set Point	74 deg F		P16-AHU-01	P16.3167	Elevator Room	SD	N/A	NO	
P15.3167 AH13.1 PHT.SP	PreHeat Set Point	50 deg F	NONE 50.00 DEG F	LP 13-1	P15.3167	Pre-Treat Patient Room Fan & Coil Units	SD	100%	Yes	
P15.3167 AH13.1 SAT.SP	Cooling Set Point	55 deg F	OPER 55.00 DEG F							
P15.3167 AH13.1 SAP.SP	Static Set Point	1.0 IWC	NONE 1.00 INWC							
P15.3167 AH02.CO.STPT.1	Cold DeckSet Point	Reset 55-63.75-55	OPER 55.00 DEG F	LP 13-2	P15.3167	Nurse Station Pods 2900 Area	DD	Pre-Treat Outside Air from P15.3167 AH05	Yes	
P15.3167 AH02.HD.STPT.1	Hot DeckSet Point	Reset 25-100.60-80	NONE 80.00 DEG F							30 day H
P15.3167 AH02.STP.STPT	Static Set Point	2.0 IWC	NONE 2.00 INWC							
P15.3167 AH03.CO.STPT.1	Cold DeckSet Point	Reset 55-63.75-55	55.00 DEG F	LP 13-3	P15.3167	Nurse Station Pods 3000 Area	DD	Pre-Treat Outside Air from P15.3167 AH05	Yes	
P15.3167 AH03.HD.STPT.1	Hot DeckSet Point	Reset 25-100.60-80	80.00 DEG F							
P15.3167 AH03.STP.STPT	Static Set Point	2.0 IWC	2.00 INWC							
P15.3167 AH04.CO.STPT.1	Cold DeckSet Point	Reset 55-63.75-55	55.00 DEG F	LP 13-4	P15.3167	R03-P12 Wing Areas	DD VAV	Pre-Treat Outside Air from P15.3167 AH05	Yes	
P15.3167 AH04.HD.STPT.1	Hot DeckSet Point	Reset 25-100.60-80	80.00 DEG F							
P15.3167 AH04.STP.STPT	Static Set Point	3.5 IWC	3.50 INWC							
P15.3167 AH05.PHT.STPT	PreHeat Set Point	45 deg F	45.00 DEG F	LP 13-5	P15.3167	Outside Air LP13-2, LP13-3, LP13-4	SD	100%	Yes	
P15.3167 AH05.SAT.STPT	Supply Set Point	55 deg F	55.00 DEG F							
P15.3167 AH05.STP.STPT	Static Set Point	0.20 IWC	0.20 INWC							
P15.3100 AH01.CO.STPT	Cold DeckSet Point	55 deg F	55.00 DEG F	BMT AHU01	P15.3100	P14 BMT CORE LAB	DD	100%	Yes	
P15.3100 AH01.HD.STPT	Hot DeckSet Point	80 deg F	80.00 DEG F							
P15.3100 AH01.STP.STPT	Static Set Point	3.0 IWC	3.00 INWC							
P15.3100 AH02A.SAT.STPT	Supply Set Point	55 deg F	55.00 DEG F	BMT AHU02A BMT AHU02B	P15.3100	P14 BMT PRODUCTION LAB	SD	100%	Yes	
P15.3100 AH02A.PHT.STPT	PreHeat Set Point	45 deg F	45.00 DEG F							
P15.3100 AH02B.SAT.STPT	Supply Set Point	55 deg F	55.00 DEG F							
P15.3100 AH02B.PHT.STPT	PreHeat Set Point	45 deg F	45.00 DEG F							
P15.3100 AH02.SAP.STPT	Static Set Point	1.8 IWC	1.80 INWC							

Milestone Energy Cost Savings: Alkek/CRB/Anderson/Gimbel



Bertner Hospital Group Chilled Water Use, Ton-Hrs

Source: Energy Cap



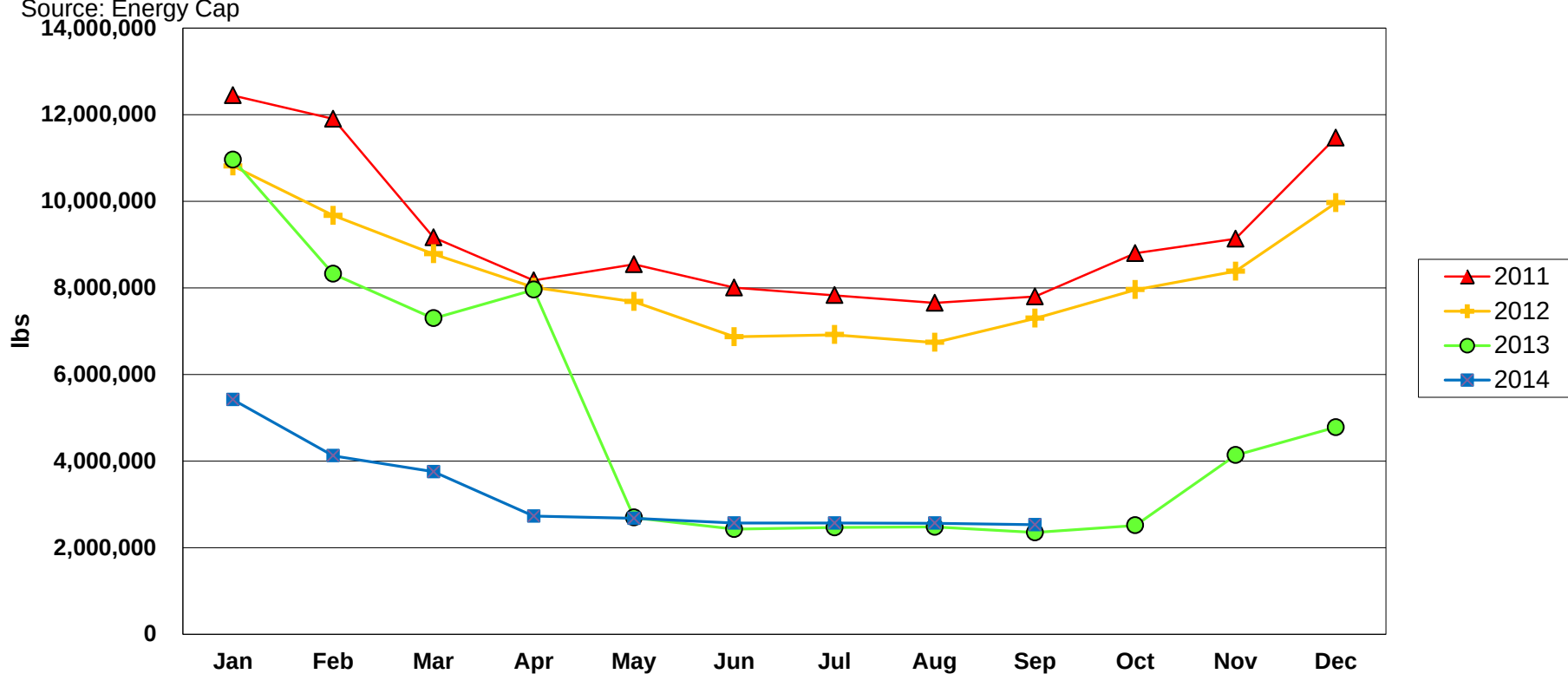
Milestone Energy Cost Savings: Alkek/CRB/Anderson/Gimbel



Bertner Hospital Group

Steam Use, Lbs

Source: Energy Cap



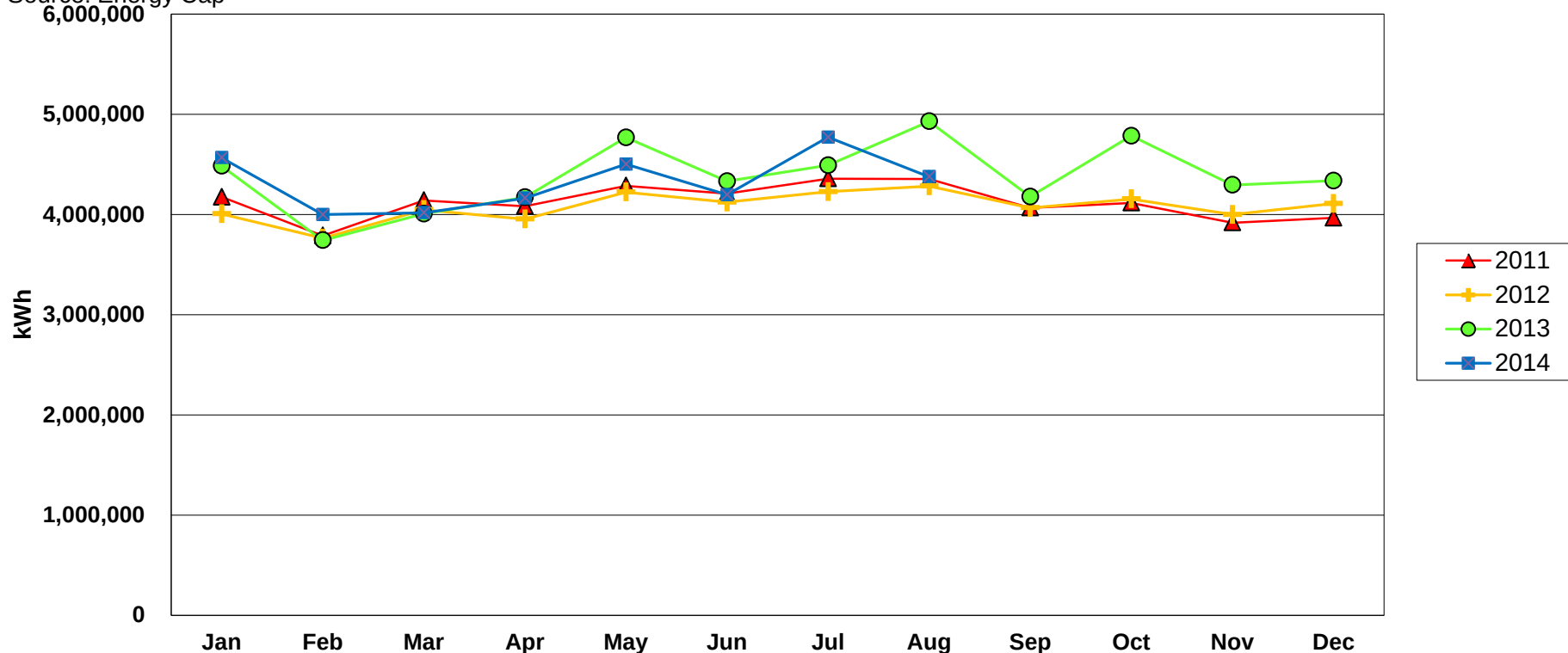
Milestone Energy Cost Savings: Alkek/CRB/Anderson/Gimbel



Bertner Hospital Group

Electric Use, kWh

Source: Energy Cap



Dollar Savings Summary



Alkek, CRB, Anderson & Gimbel Energy Cost Savings -2014

	Electric KWH	Chilled Water hours	Ton- Chilled Water Gallons	Steam Pounds	Total Building
Jan	-\$29,675	\$108,248	\$14,175	\$117,551	\$210,298
Feb	-\$16,057	\$123,670	\$12,329	\$130,144	\$250,085 Corrected use for Feb.
Mar	\$9,438	\$215,777	\$14,580	\$90,498	\$330,293
Apr	-\$5,995	\$230,298	\$12,230	\$91,079	\$327,611
May	-\$16,375	\$215,065	\$10,418	\$98,138	\$307,245
Jun	\$798	\$147,604	\$5,290	\$90,944	\$244,636
Jul	-\$31,407	\$165,866	\$6,055	\$88,017	\$228,532
Aug	-\$1,686	\$154,898	\$892	\$85,134	\$239,237
Sep	-\$8,430	\$14,868	-\$1,232	\$151,570	\$156,776
Oct	-\$50,867	\$45,400	-\$137	\$105,207	\$99,603
Nov	-\$28,552	\$182,072	-\$861	\$83,632	\$236,290
Dec	-\$10,851	\$138,880	\$1,299	\$111,875	\$241,204
Total	-\$189,661	\$1,742,647	\$75,037	\$1,243,789	\$2,871,812

Baseline consumption, 2011

Milestone Energy Cost Savings: Over \$ 1,000,000

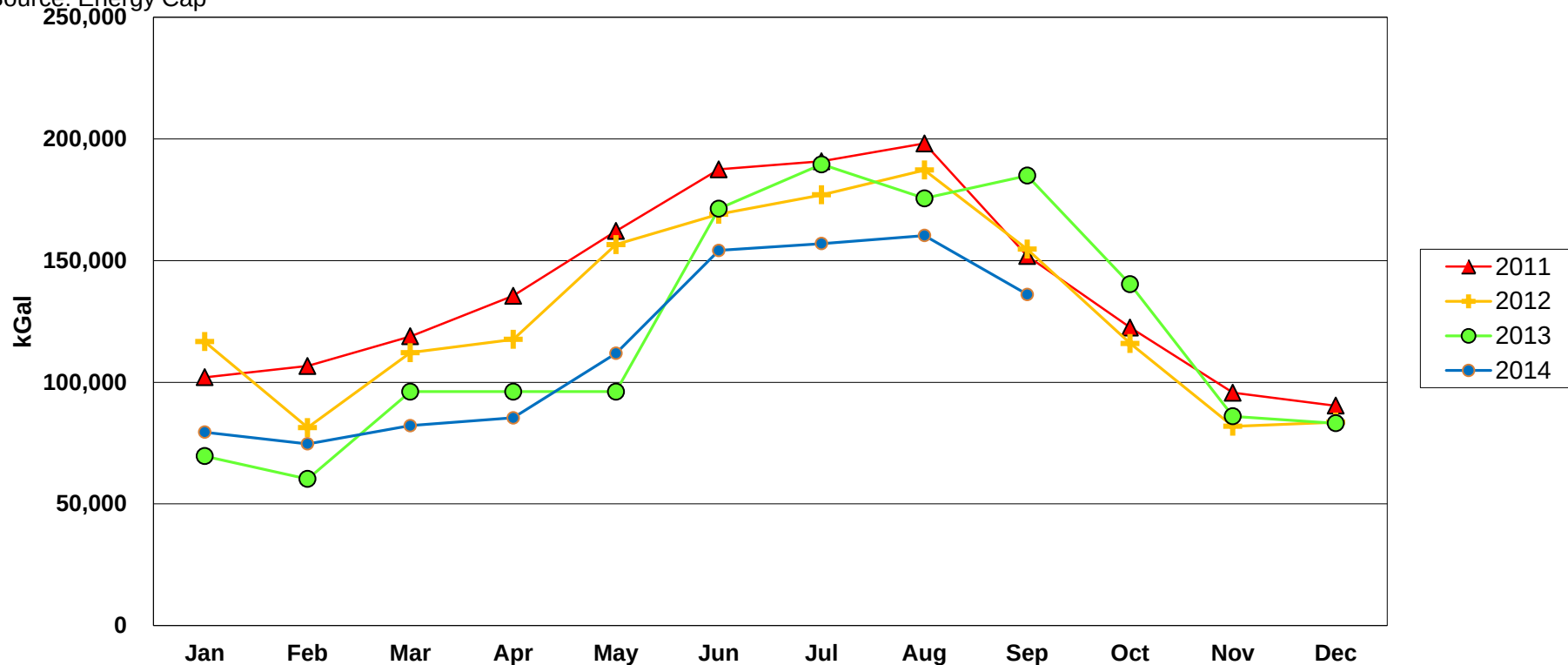
LP/OCC: ChW Gal



Lutheran-Old Clark

Chilled Water Use, Gallons x1000

Source: Energy Cap



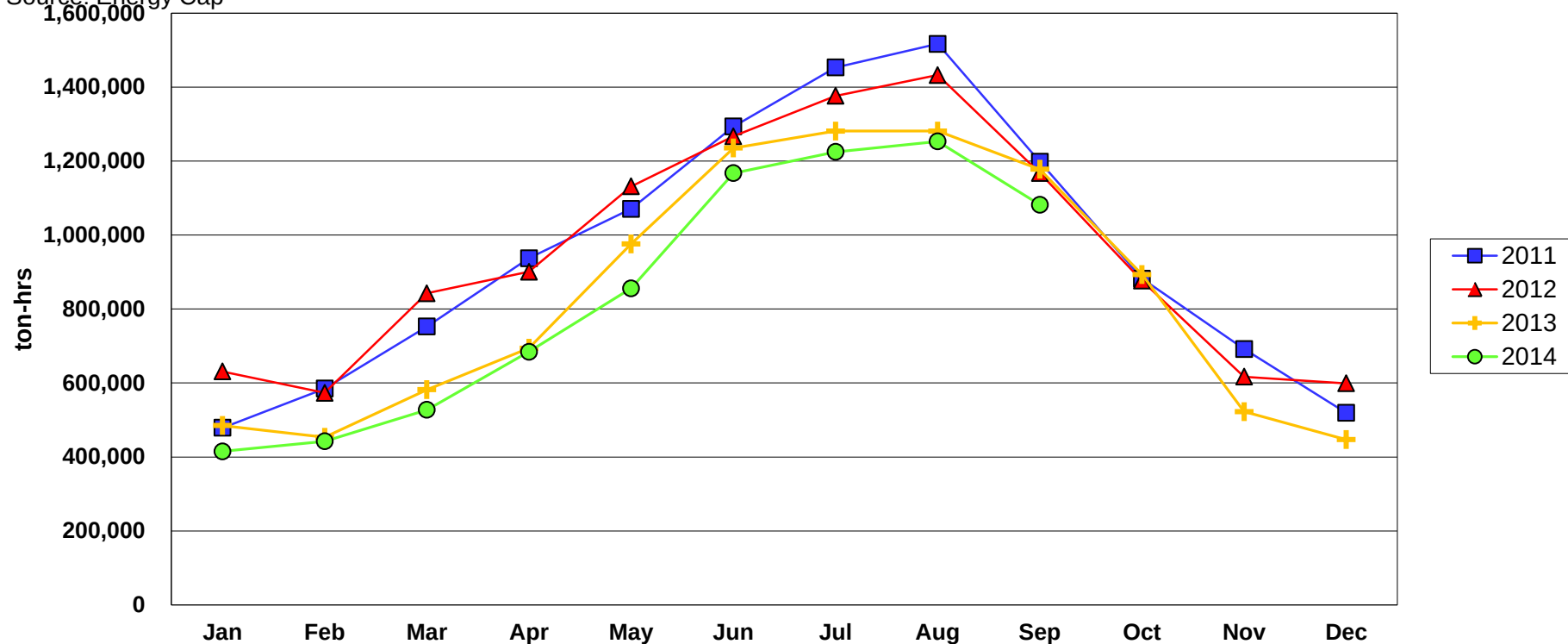
Milestone Energy Cost Savings: Over \$ 1,000,000

LP/DCC : ChW Ton-hr



Lutheran-Old Clark Chilled Water Use, Ton-Hrs

Source: Energy Cap



Milestone Energy Cost Savings: Over \$ 1,000,000

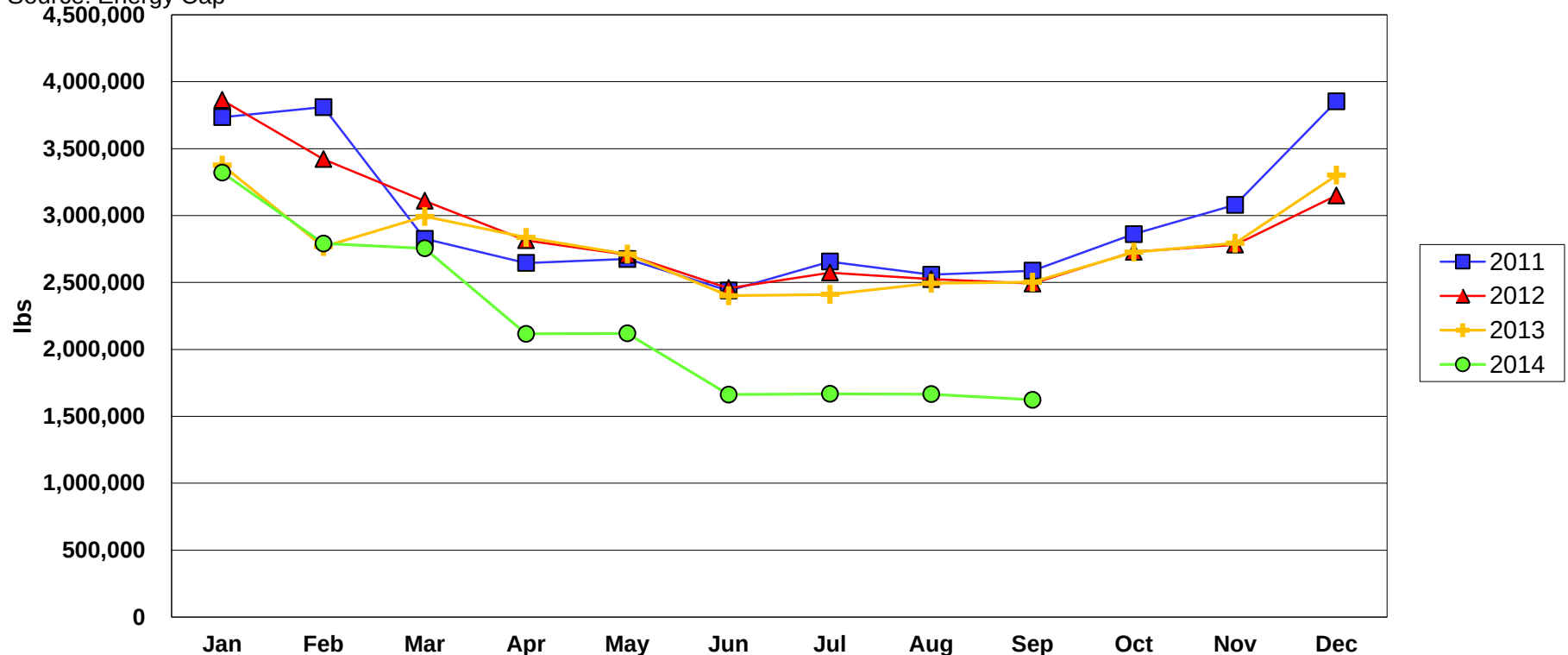
CSF/NCC: Steam



Lutheran-Old Clark

Steam Use, Lbs

Source: Energy Cap



Dollar Savings Summary



Lutheran-Old Clark Energy Savings Summary- 2014

	Chilled Water Ton-hours	Chilled Water Gallons	Steam Pounds	Total Building
Jan	\$85,790	\$27,738	\$18,706	\$132,234
Feb	\$98,436	\$20,979	\$8,828	\$128,243
Mar	\$70,940	\$18,908	\$10,045	\$99,894
Apr	\$80,774	\$20,631	\$10,315	\$111,720
May	\$80,298	\$21,285	\$7,385	\$108,968
Jun	\$60,662	\$19,916	\$12,941	\$93,519
Jul	\$71,385	\$17,686	\$14,329	\$103,400
Aug	\$54,277	\$19,519	\$19,729	\$93,525
Sep	\$46,386	\$12,972	\$37,989	\$97,346
Oct	\$45,723	\$21,502	\$12,110	\$79,335
Nov	\$74,638	\$19,277	\$13,929	\$107,844
Dec	\$79,339	\$18,548	\$23,672	\$121,559
Total	\$848,648	\$238,961	\$189,978	\$1,277,587

Baseline data:
2008

New Clark-Love-LeMaistre Energy Savings Summary-2014

	Chilled Water Ton- hours	Chilled Water Gallons	Steam Pounds	Total Building
Jan	\$27,419	\$5,051	\$28,571	\$61,041
Feb	\$40,103	\$3,585	\$16,975	\$60,663
Mar	\$46,723	\$4,536	\$10,841	\$62,100
Apr	\$34,426	\$3,236	\$8,020	\$45,682
May	\$54,813	\$3,661	\$5,321	\$63,795
Jun	\$39,197	\$2,303	\$7,517	\$49,016
Jul	\$34,254	\$1,872	\$6,893	\$43,019
Aug	\$26,862	\$1,745	(\$2,224)	\$26,383
Sep	\$7,419	\$948	\$4,794	\$13,161
Oct	-\$11,141	\$1,158	(\$3,892)	-\$13,875
Nov	\$32,288	\$3,200	\$4,561	\$40,049
Dec	\$40,648	\$3,764	\$24,175	\$68,586
Total	\$373,012	\$35,059	\$111,549	\$519,620

Baseline data: 2008

Energy Star Buildings



MOB-Administration/Faculty Space

First Energy Star Building-2009



Key Points: Implementation and Sustainability

- O&M Team training
- Energy conservation culture
- Celebrate major milestone accomplishment
- Small or no capital instead of large capital projects
- Daily energy inefficiency actionable report
- Balance between Energy Innovation and Environment Improvement



Thank you!

