Federal Facilities Council

National Gallery of Art

"Best Practices to Meet Mission and Energy Costs Targets"

David Samec, P.E., CFM
Chief of Facilities Management

June 12, 2013

The National Gallery of Art

- Andrew Mellon donated his art collection in 1936 to the U.S. for a new national art museum
- Designed by Russell Pope
- West Building built March 1937 – December 1940
- Mellon's children funded a second building for modern art, designed by I.M. Pei
- East Building built 1971 –June 1978
- Sculpture Garden constructed and opened in May 1999
- Nearly 5,000,000 visitors annually

Facilities Management at the National Gallery of Art

- 1,374,000 square feet of facilities
- 10.2 acres of landscaped grounds
- 6.2 acre National Sculpture Garden
- 70,900 linear feet of glass windows
- 16,800 light fixtures
- 64 rest rooms
- 363 plumbing fixtures
- 34 conveyance systems
- 53 major air handling systems
  - most with air washers
- 1,500 major facility assets
- 10,000 point BAS

The National Gallery of Art's Mission

"To serve the United States of America in a national role by preserving, collecting, exhibiting, and fostering the understanding of works of art at the highest possible museum and scholarly standards."

Facilities Management Mission

"…preserving…great works of art."

Temperature = 70-degrees F +/- 5-degrees

Relative Humidity = 50% +/- 5%

WEST EAST

Sustainability - a Hot Topic Around the World

Triple Bottom Line

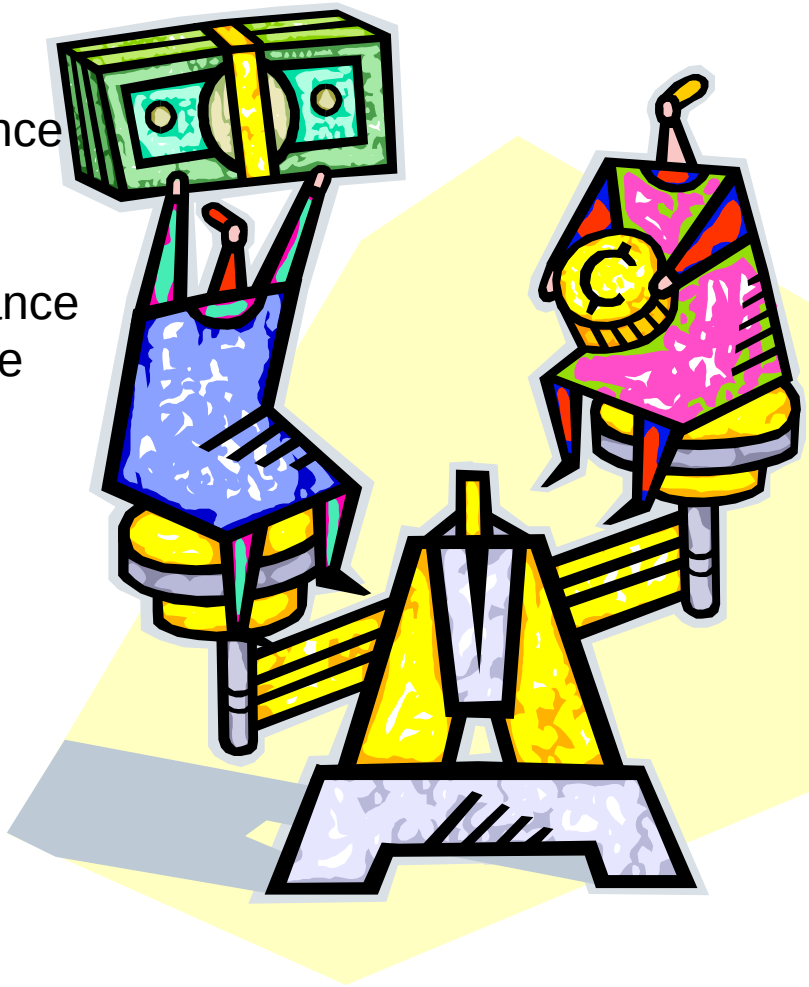
Sustainability:
"…meeting the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainability - Legislation

1965 Solid Waste Disposal Act
1970 Clean Air Act
1976 Resource and Recovery Act
1978 National Energy Act
1980 Energy Security Act
1998 EO 13101 – Greening the Government Through Waste Reduction, Recycling, and Federal Acquisition
2005 Energy Policy Act
2006 ISO 14064-1/2/3 “Greenhouse Gases”
2006 Guiding Principles for Federal Leadership in Sustainable Buildings
2007 Energy Independence and Security Act
2007 EO 13423 - Strengthening Federal Environmental, Energy, and Transportation Management
2009 The American Recovery and Reinvestment Act of 2009
2009 EO 13514 - Federal Leadership in Environmental, Energy, and Economic Performance

Balancing Sustainability with Budget

Art Preservation
Staff
Visitors
Daily Cleaning
Preventive Maintenance
Daily Operations
Routine Maintenance
Emergency Maintenance
Deferred Maintenance
Equipment
Utilities Bills
Exhibitions
Art Moves
Special Projects
Special Events
Project Backlogs
Safety
Security
Mobile Devices
IT



Sustainability Goals
Energy Consumption Reduction
Energy Conservation Measures
Greenhouse Gas Reductions
Green Cleaning
Social Programs

Combining Sustainability with Budget

Art Preservation
Daily Cleaning
Preventive Maintenance
Daily Operations
Routine Maintenance
Emergency Maintenance
Deferred Maintenance
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Utilities Bills
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Security
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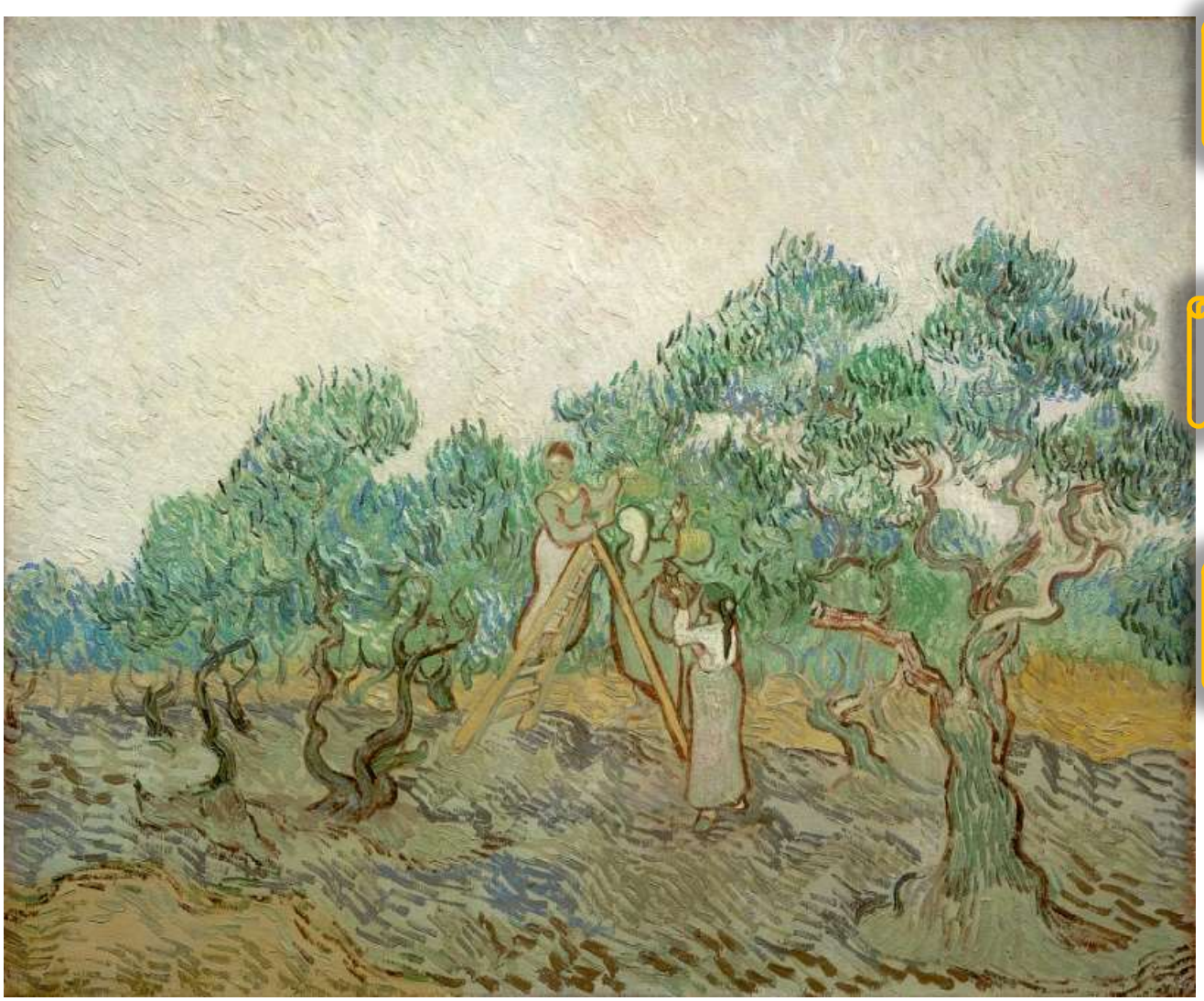
IT

Sustainability Goals
Energy Consumption Reduction
Energy Conservation Measures
Greenhouse Gas Reductions
Green Cleaning
Social Programs

Reach for All Hanging Fruit



High Hanging Fruit

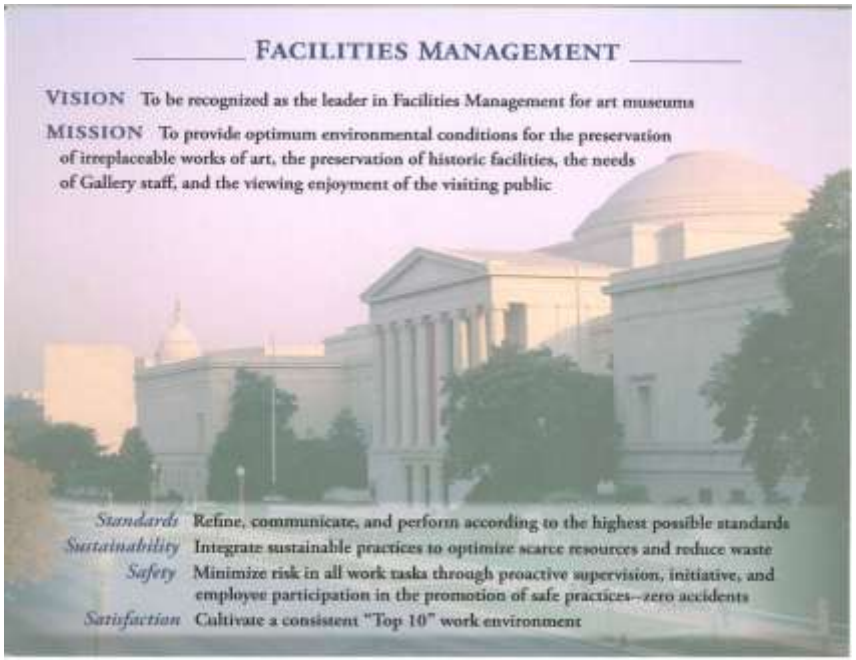
Medium Hanging Fruit

Low Hanging Fruit

Vincent van Gogh, The Olive Orchard,1889

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Alignment of Vision, Mission, and Goals



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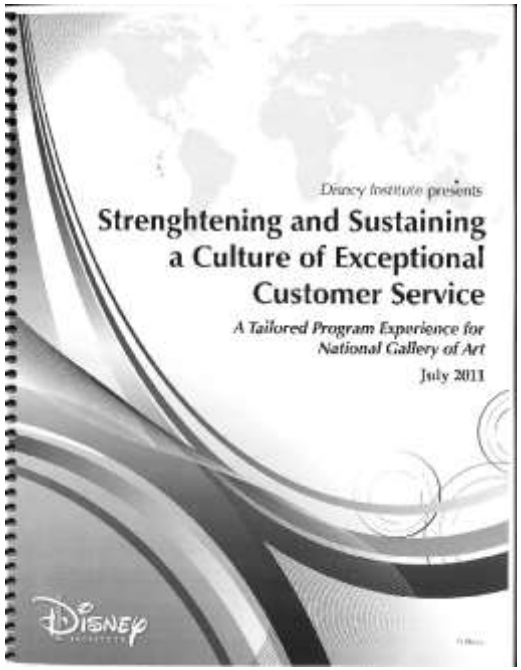

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Leaders empowered to improve services, to include sustainable practices

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Establish a Sustainability Office

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Good Communications Between Gallery Staffs

- Curators
- Exhibitions
- Design and Construction
- Registrar
- Conservators
- Safety - Risk Management
- Fire Marshal
- Security
- Facilities Management
- Legal – Loan Agreements

Best Practices to Meet Mission and Energy Costs Targets

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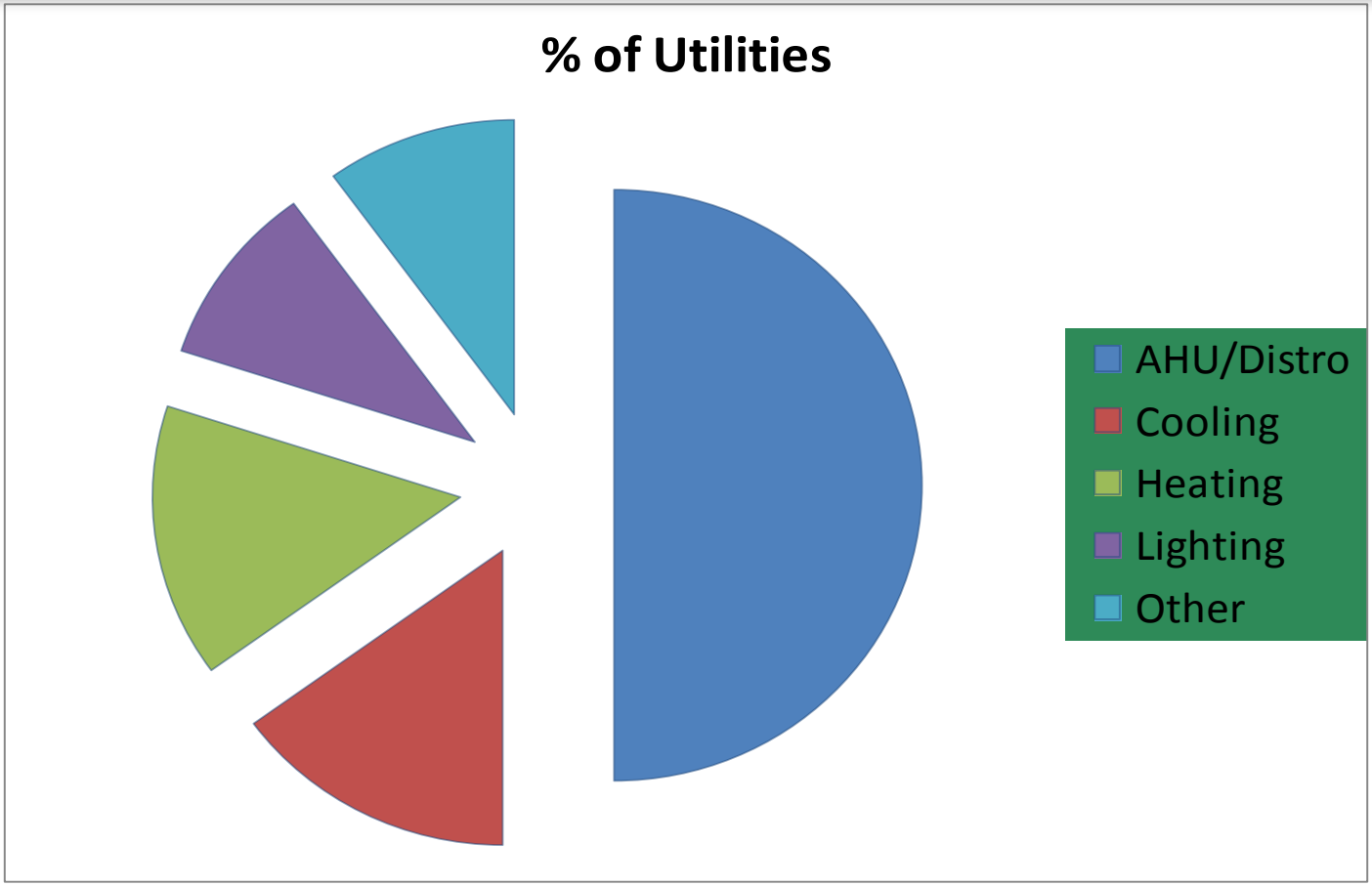
Best Practices to Meet Mission and Energy Costs Targets

Fruit: Good Communications Between Gallery Staffs

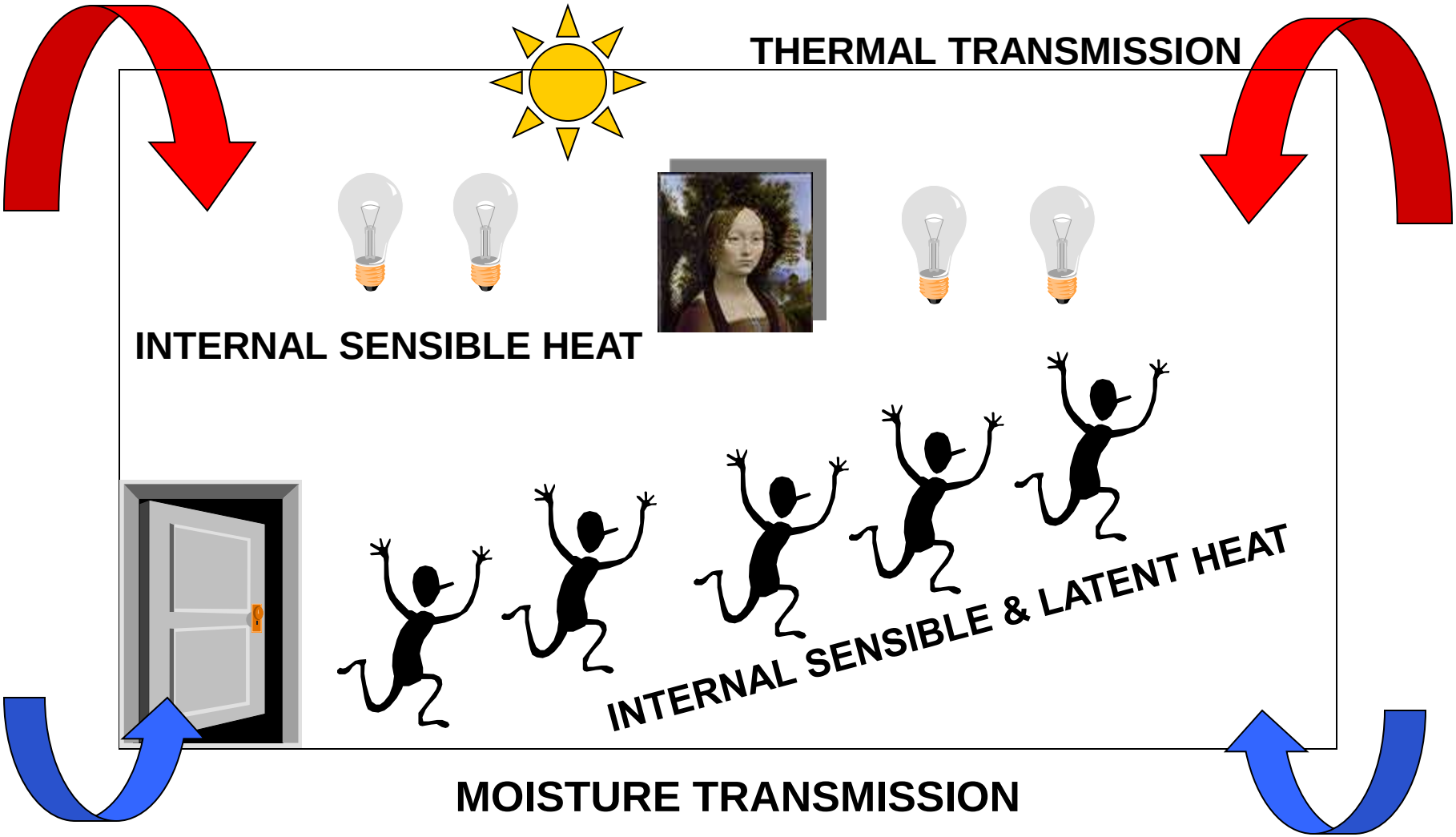
Best Practices to Meet Mission and Energy Costs Targets

Fruit: Know Where You Are Spending in Your Facilities



So Let's Look at Our Building

SOURCES OF HEAT AND MOISTURE TRANSMISSION



Facilities Management Mission

Temperature = 70-degrees F +/- 5-degrees

Relative Humidity = 50% +/- 5%

"…preserving…great works of art."

A – Humidification Only (Up)

B – Heating and Humidifying

C – Sensible Heating Only (Right)

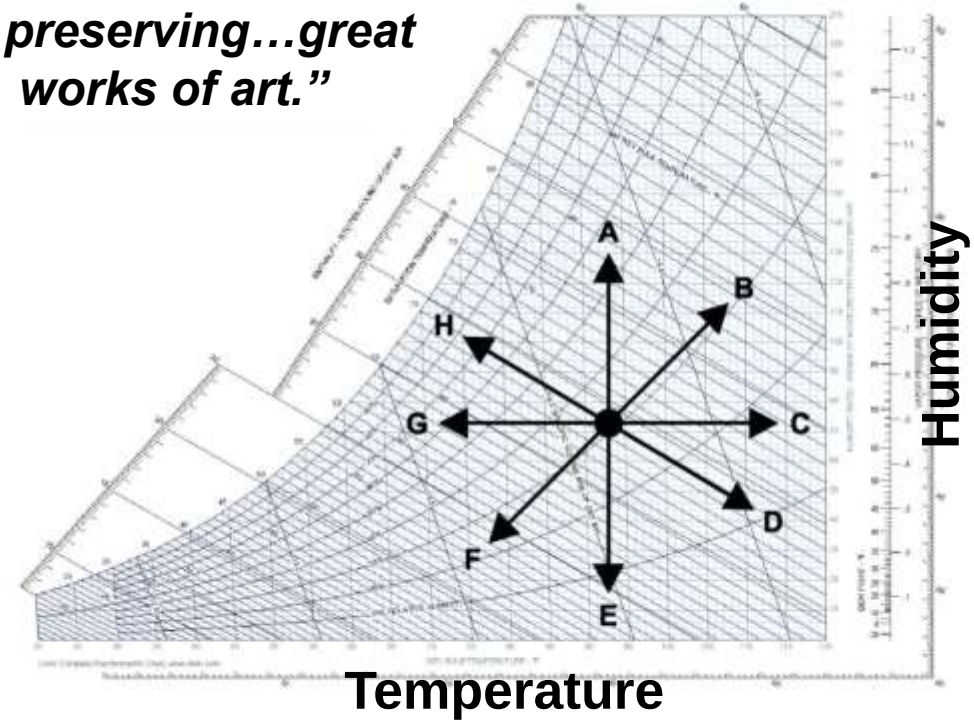
D – Desiccant Dehumidifying

E – Dehumidification Only (Down)

F – Cooling & Dehumidifying

G – Sensible Cooling Only

H – Evaporative Cooling Only

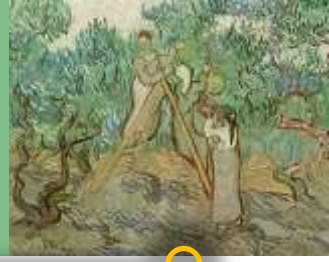


PSYCHROMETRIC PROCESSES

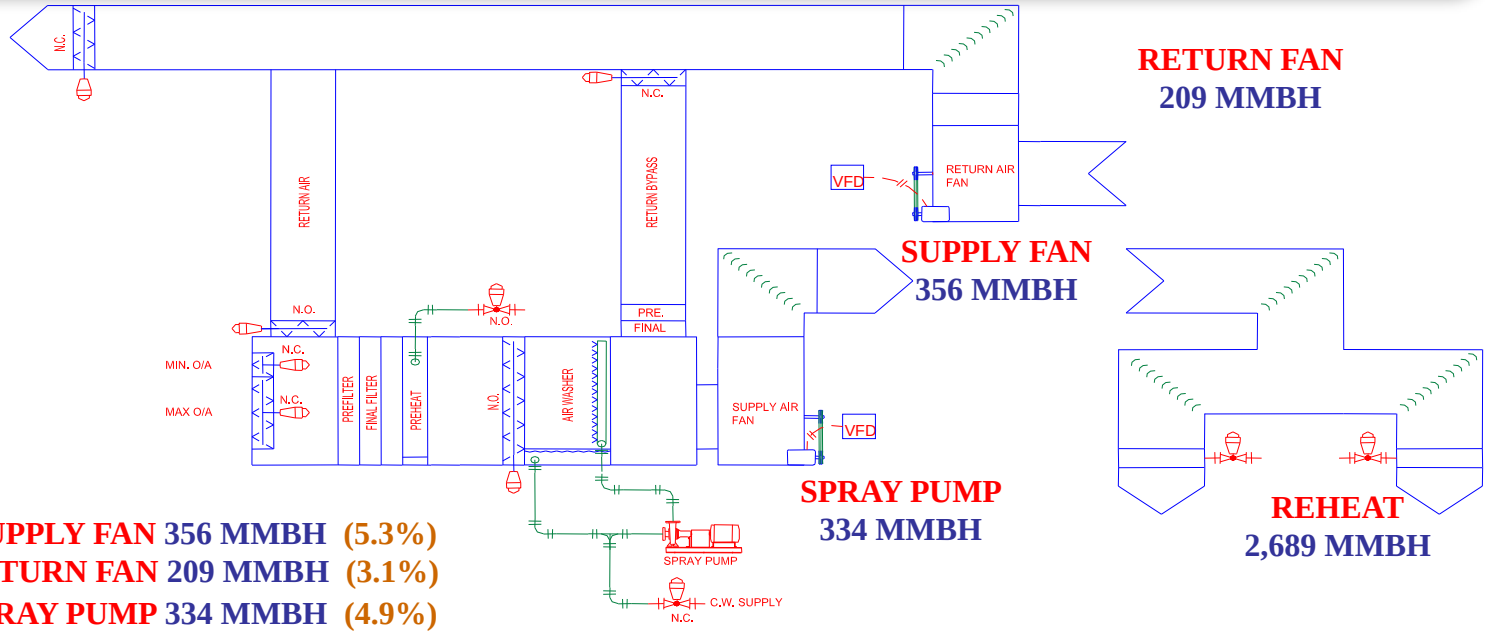
WEST

EAST

Best Practices to Meet Mission and Energy Costs Targets



Fruit: Conduct Regular Energy Audits to Check the Condition and Efficiency of Your Equipment



RETURN FAN
209 MMBH

SUPPLY FAN
356 MMBH

SPRAY PUMP
334 MMBH

REHEAT
2,689 MMBH

CHILLED WATER
3,157 MMBH

SUPPLY FAN 356 MMBH (5.3%)
RETURN FAN 209 MMBH (3.1%)
SPRAY PUMP 334 MMBH (4.9%)
REHEAT 2,689 MMBH (39.9%)
CHILLED WATER 3,157 MMBH (46.8%)

TOTAL ENERGY CONSUMPTION
6,745 MMBH

* MMBH = 1 MILLION BTU/HR

Best Practices to Meet Mission and Energy Costs Targets

WAC NO. 16 OCCUPIED SPACE COOLING LOAD SUMMARY									
SPACE NO.	FLOOR AREA (SF)	CEILING (BTU/ HR)	WALL (BTU/ HR)	LAYLIGHT SOLAR (BTU/ HR)	LIGHTS (BTU/ HR)	PEOPLE SH (BTU/ HR)	ROOM SH (BTU/ HR)	PEOPLE LH (BTU/ HR)	ROOM TH (BTU/ HR)
M-46	848	14,378	---	6,020	6,649	4,240	31,287	4,240	35,527
M-47	1,283	21,495	5,090	11,200	10,946	6,416	55,147	6,416	61,563
M-48	1,166	19,648	---	9,100	7,331	5,830	41,909	5,830	47,739
M-49	959	16,129	3,959	8,064	7,945	4,794	40,891	4,794	45,685
M-50	944	15,903	3,733	8,064	6,308	4,720	38,728	4,720	43,448
M-50A	203	---	1,697	---	4,297	1,015	7,009	1,015	8,024
M-50B	378	1,316	---	---	6,343	1,890	9,549	1,890	11,439
M-50C	210	---	---	---	4,910	1,051	5,961	1,051	7,012
M-51	848	14,378	---	6,048	7,297	4,240	31,963	4,240	36,203
TOTAL	6,839	103,247	14,479	48,496	62,026	34,196	262,444	34,196	296,640

NOTES:

1. PERIMETER ZONE (RHC 16-1) PEAK COOLING - SEPTEMBER 6:00 PM, 80°F DB.
2. INTERIOR ZONE (RHC 16-2) PEAK COOLING - JULY 2:00 PM, 92°F DB.
3. OCCUPANCY - 50 SF/PERSON, 250 BTU/HR SH, 250 BTU/HR LH.

178,914 BTU/HR

60% OF TOTAL LOAD

Best Practices to Meet Mission and Energy Costs Targets

NEW HEADER PRESSURE CONTROL

NEW PUMP VARIABLE FREQUENCY DRIVE

NEW AIR FLOW STATIONS

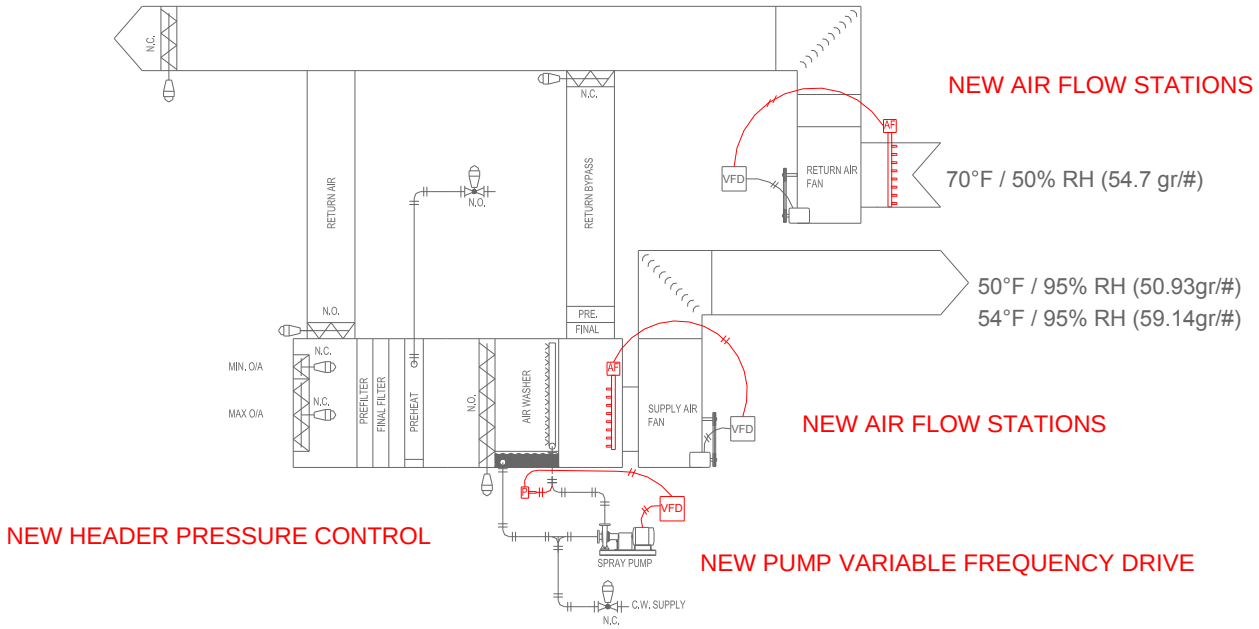
NEW INSTRUMENTATION

- SUPPLY FAN AIR FLOW STATION
- RETURN FAN AIR FLOW STATION
- SPRAY PUMP VARIABLE FEQUENCY DRIVE
- SPRAY HEADER PRESSURE CONTROL

NEW CONTROL SEQUENCE MODIFICATION

- SUPPLY FAN AIR FLOW SET TO MAINTAIN 14,000 CFM
- RETURN FAN AIR FLOW SET TO MAINTAIN 11,900 CFM
- SPRAY PUMP VARIABLE FEQUENCY DRIVE CONTROLLED FROM HEADER PRESSURE SENSOR
- SPRAY HEADER PRESSURE CONTROL MAINTAINS A HEADER PRESSURE EQUIVILENT TO 151 GPM
- RE-IMPLEMENT DISCHARGE AIR RESET FOR HUMIDITY CONTROL

Best Practices to Meet Mission and Energy Costs Targets



- **REDUCE AIR VOLUME FROM 18,700 CFM TO 14,000 CFM**
- **REDUCE SPRAY PUMP FLOW RATE FROM 290 GPM TO 151 GPM**
- **REDUCE OUTSIDE AIR VOLUME FROM 2,805 CFM TO 2,100 CFM**
- **ADJUST INDIVIDUAL GALLERY OUTLETS BASED ON LOAD CALCULATIONS FOR INDIVIDUAL GALLERIES**

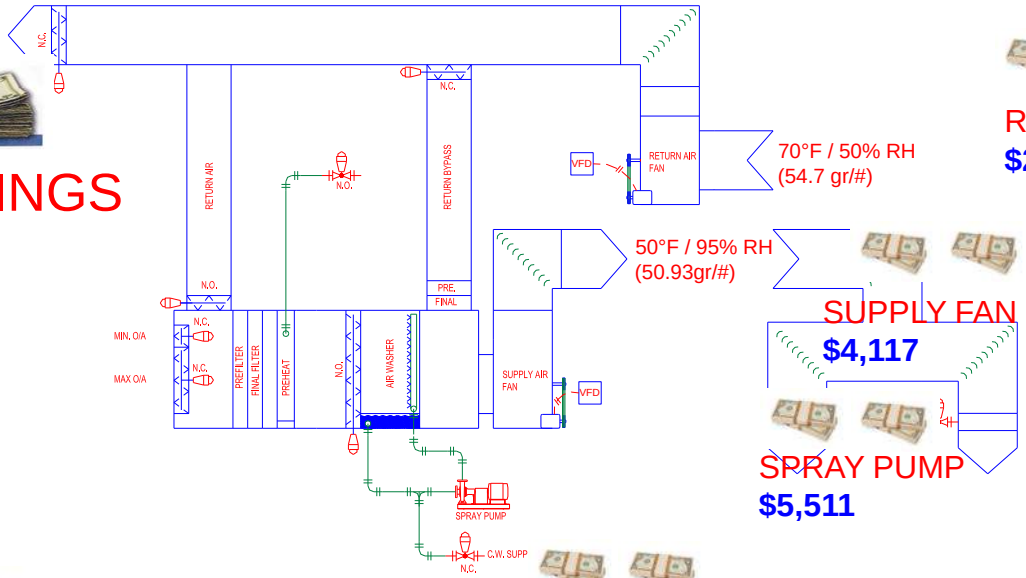
Best Practices to Meet Mission and Energy Costs Targets

Fruit: Align HVAC Use With Occupancy

WEST AC#16

MODEL AFTER THE RE-INSTRUMENTATION AND AIR & WATER BALANCE AND IMPLEMENTATION OF UNOCCUPIED BYPASS

BYPASS SAVINGS
$23,223



RETURN FAN
$2,059

SUPPLY FAN
$4,117

SPRAY PUMP
$5,511

REHEAT
$54,884

CHILLED WATEI
$26,352

TOTAL OPERATING COST
$92,985

TAB SAVINGS
$65,622

UNOCC SAVINGS
$20,263

Best Practices to Meet Mission and Energy Costs Targets

TOTAL ESTIMATED WEST BUILDING SAVINGS

WEST BLDG TAB SAVINGS
$524,073

WEST BLDG UNOCCUPIED SAVINGS
$506,613

WEST BLDG BYPASS SAVINGS
$578,841

ESTIMATED WEST BUILDING SAVINGS

$1,609,527

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Be Creative with HVAC Schedules

Rolling Outages"…The following units will
turn off for 60 mins and come back on to help conserve energy.

THESE UNITS WILL SHUT DOWN FOR 60MINS IN A 24 HOUR PERIOD
WEST BUILDING UNITS

	OFF	ON	OFF	ON	OFF	ON
WAC1	12M	2AM	9PM	11PM		
WAC2	2AM	4AM	7PM	9PM		
WAC3	7AM	8AM	10PM	11PM		
WAC4	3AM	4AM	6PM	7PM		
WAC6		945AM	5PM			
WAC7	DOESN'T SHUT DOWN					
WAC12	4AM	5AM	8AM	9AM		
WAC13	1AM	3AM	9AM	10AM		
WAC14	5AM	6AM	8PM	9PM		
WAC15	7AM	8AM	10PM	11PM		
WAC18	2AM	4AM	6PM	8PM		
WAC19	5AM	6AM	8PM	10PM		
WAC16	8AM	9AM	11PM	12M		
WAC8	DOESN'T SHUT DOWN..UNIT HAS EXHAUST HOODS					
WAC21	1AM	3AM	9AM	10AM		
WAC"X"	3AM	4AM	6PM	7PM		
WAC20	DOESN'T SHUT DOWN					
WAC21	1AM	3AM	9AM	10AM		
WAC22	DOESN'T SHUT DOWN					
WAC26	DOESN'T SHUT DOWN..UNIT HAS A SPRAY BOOTH					

EAST BUILDING UNITS

EAC1	12M	2AM	8AM	9AM		
EAC2	3AM	4AM	7PM	8PM		
EAC3	DOESN'T SHUT DOWN					
EAC4	4AM	5AM	7PM	9PM		
EAC5	1AM	2AM	9AM	10AM		
EAC6		6AM	5PM			
EAC7	2AM	3AM	5PM	6PM		
EAC8	DOESN'T SHUT DOWN					
EAC10	8AM	9AM	11PM	12AM		
EAC12	12M	1AM	9AM	10AM		
EAC9	5AM	6AM	10PM	11PM		
EAC13	12AM	6AM	7AM	8AM	10PM	12AM
EAC14	7AM	8AM	11PM	12M		
EAC21	7AM	8AM	11PM	12M		

EAST BUILDING CON'T

EAC22	DOESN'T SHUT DOWN					
EAC23	5AM	6AM	9PM	10PM		
EAC31	4AM	5AM	7PM	8PM		
EAC20		12AM	6PM	7PM		
EAC11	7AM	8AM	10PM	11PM		
EAC27	3AM	4AM	7PM	9PM		
EAC24	4AM	5AM	8PM	10PM		
EAC25	1AM	3AM	5PM	6PM		
EAC26	6AM	7AM	10PM	11PM		
EAC28	2AM	4AM	7PM	9PM		
EAC32	12AM	6AM	7AM	9PM	10PM	12AM
EAC33		6AM	6PM			
EAC34		6AM	6PM			
EAC35	5AM	6AM	8PM	9PM		
EAC36	12M	1AM	6PM	7PM		
EAC30	3AM	4AM	6PM	7PM		

Best Practices to Meet Mission and Energy Costs Targets

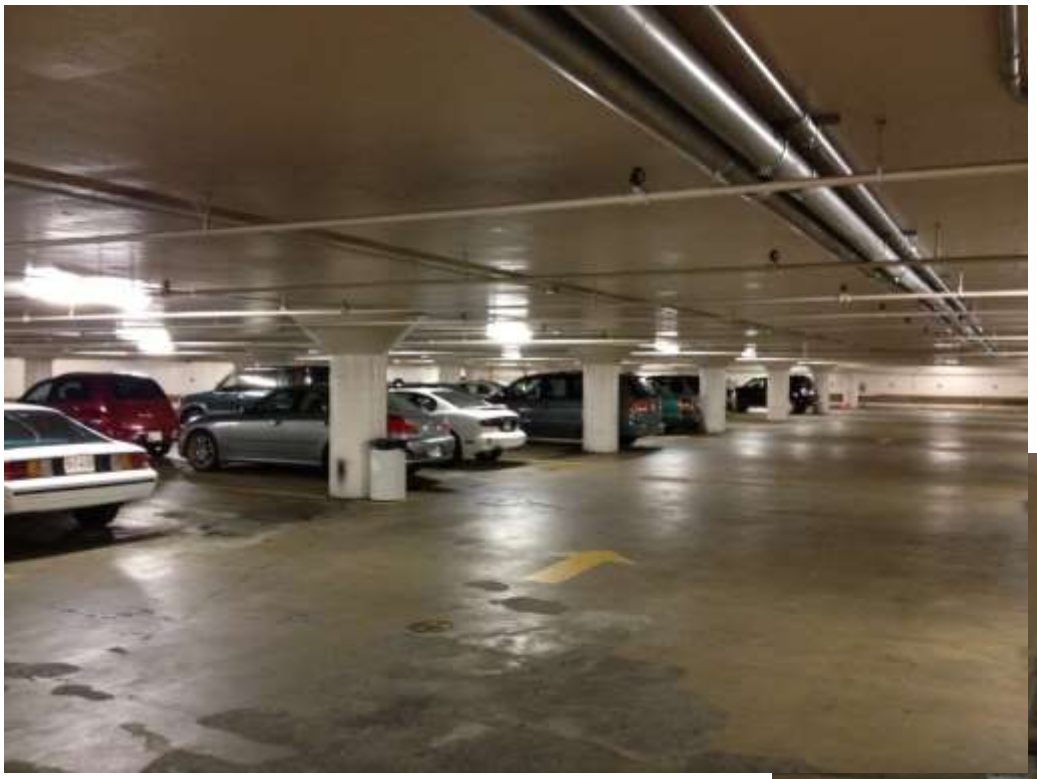
Fruit: Use Daylighting Where Possible

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Convert Lights to Lower Energy Use Lights

Incandescent **Fluorescent** **LEDs**

Improvements with Fluorescents



Replaced 93 T-8's with 45 new T5's

Put lights on BAS schedule & added motion sensors

Use Available Technology

New Gallery Lights

- 90W → 19.5W
- No visible light differences
- 41-year life
- Temperature drop ~3-degrees
- ~4-year payback (getting better)

COTS →

High Tech Light

- Full light spectrum
- No LED “droop”
- Minimal heat
- UL listed
- 1/4 wattage of LED

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Add Metering and Sub-Metering

BAS Sensors (T/RH/Pressure)

Chilled Water Sub-Meter

Air Flow Meter

Electricity Meters & Sub-Meters

Water Meter & Sub-Meters

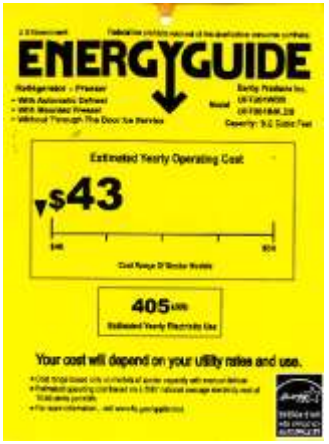
Building Automation System

- Proprietary system since 1990's
- 2006 migration to "open system"
- Going wireless
- 51 major AHUs
- 116 digital controllers
- 10,000 total points
- 800 T/RH sensors
- Lighting controls
- Chiller plant control

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Buy Energy Efficient Equipment

Auto Duplex Print

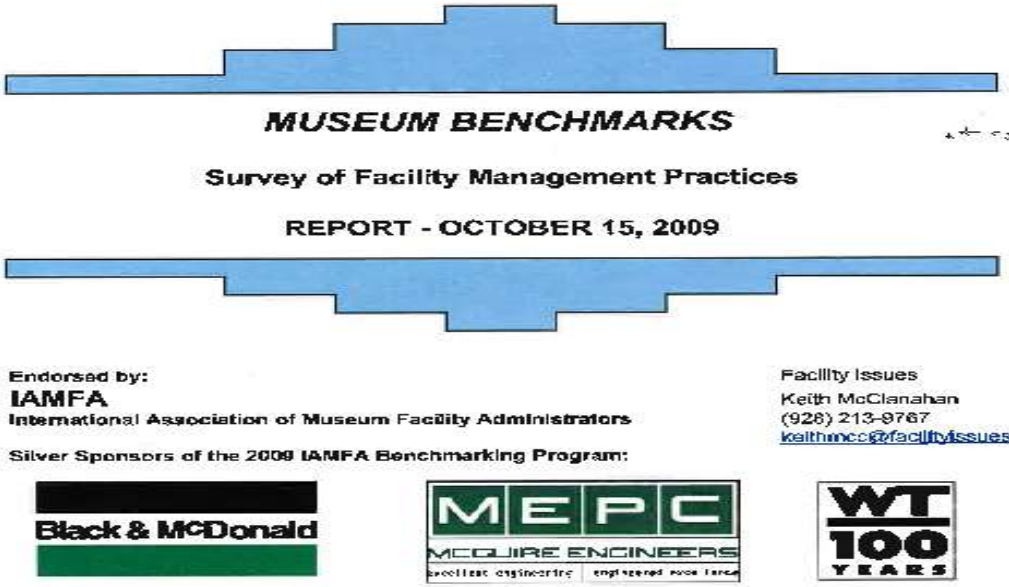


ENERGY STAR

NATIONAL GALLERY OF ART U.S.A.

Learn from Others Within Your Industry

Fruit: Benchmark Against Other Like Facilities



MUSEUM BENCHMARKS

Survey of Facility Management Practices

REPORT - OCTOBER 15, 2009

Endorsed by:
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MEPC
McGUIRE ENGINEERS

WT 100 YEARS

Facility Issues
Keith McClanahan
(928) 213-9767
keithmcc@facilityissues.com

International Association Of Museum Facilities Administrators (IAMFA)

International Facility Management Association (IFMA)

American Association Of Museums (AAM)

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Schedule Work During Regular Shift Hours

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Use New Sustainable Technology in Daily Business

Low & No VOC Paints

Re-Using What We Have

Timers on Irrigation systems

Motion Sensors

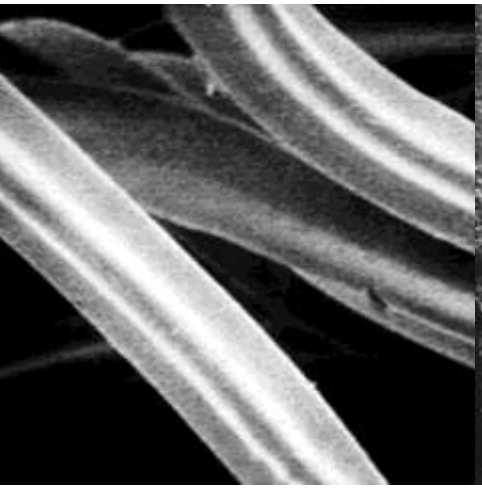
Green cleaning

Green seal certified

EPA Design for Environment

Best Practices to Meet Mission and Energy Costs Targets

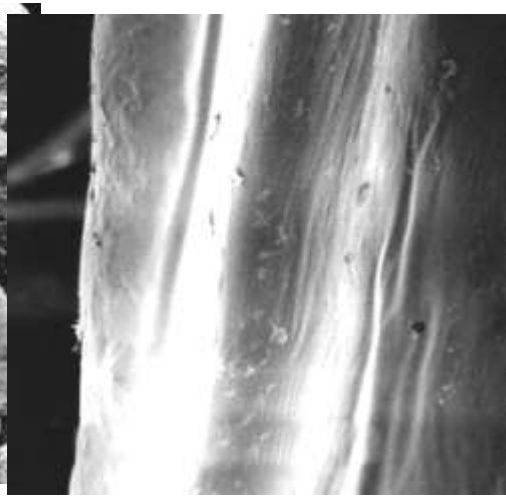
Different Cleaning Systems = Different Carpet "Life"



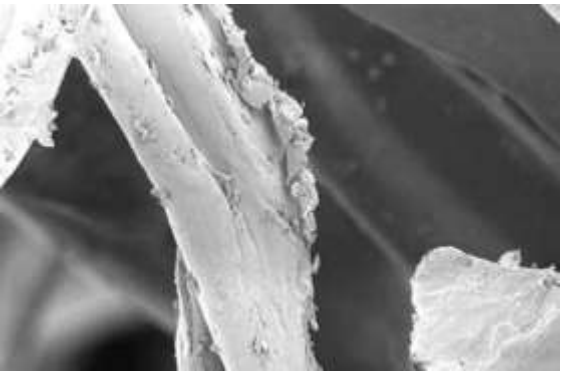
New Carpet Fiber

New Carpet Fiber
After Wet Extraction
Cleaning

New Carpet Fiber
After Spin Bonnet
Cleaning



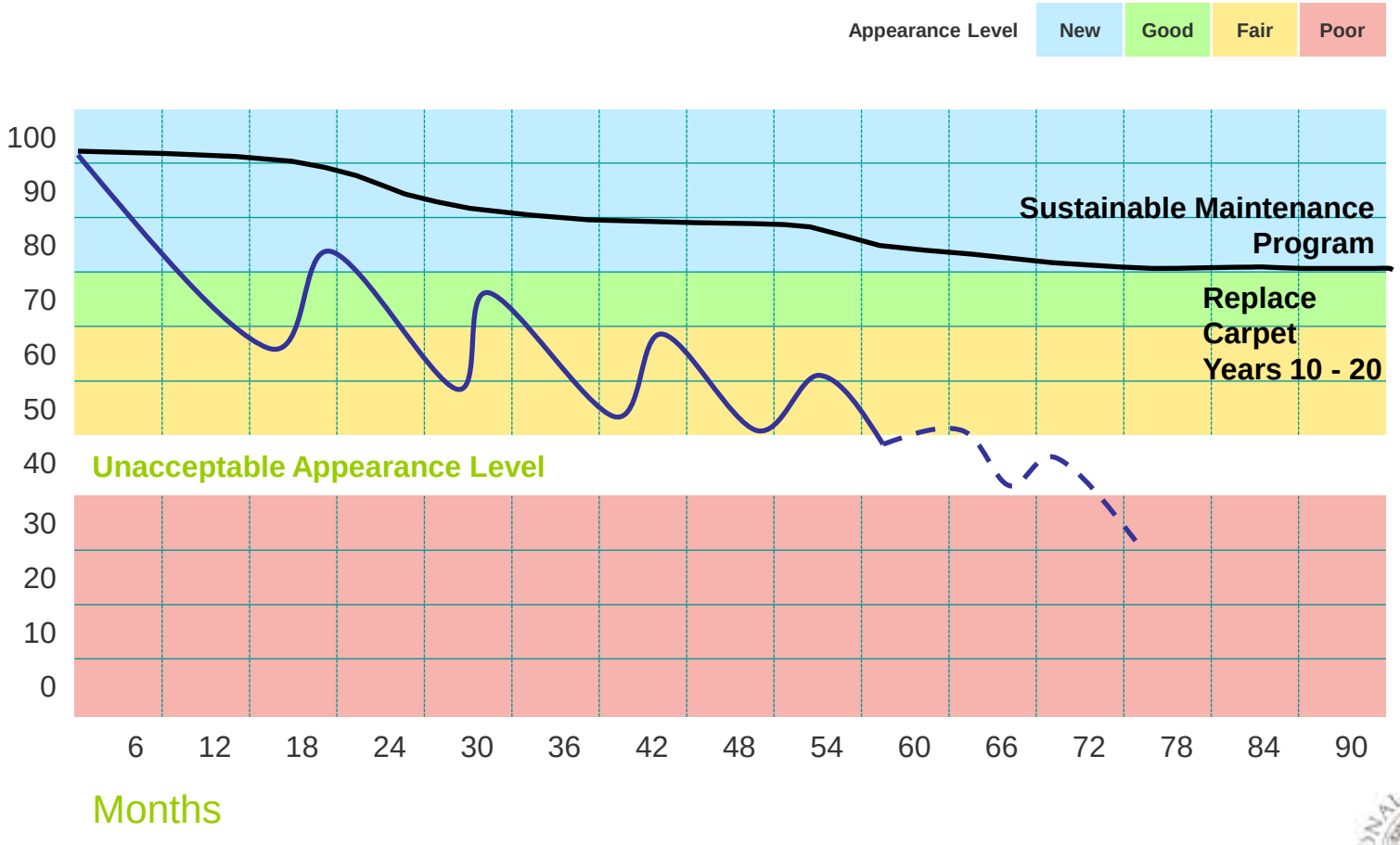
New Carpet Fiber
After Sustainable
Carpet Cleaning



New Carpet Fiber
Crystalline Cleaning

Best Practices to Meet Mission and Energy Costs Targets

Proper Maintenance Extends the Life of Carpet



Reduces Landfill Waste AND saves money!!!!

Keep up with Training and Technology

Fruit: Look for Free or Inexpensive Training

Webinars

Local Training & Conferences

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Network with Others in Profession

Meeting Federal Mandates

EO 13423

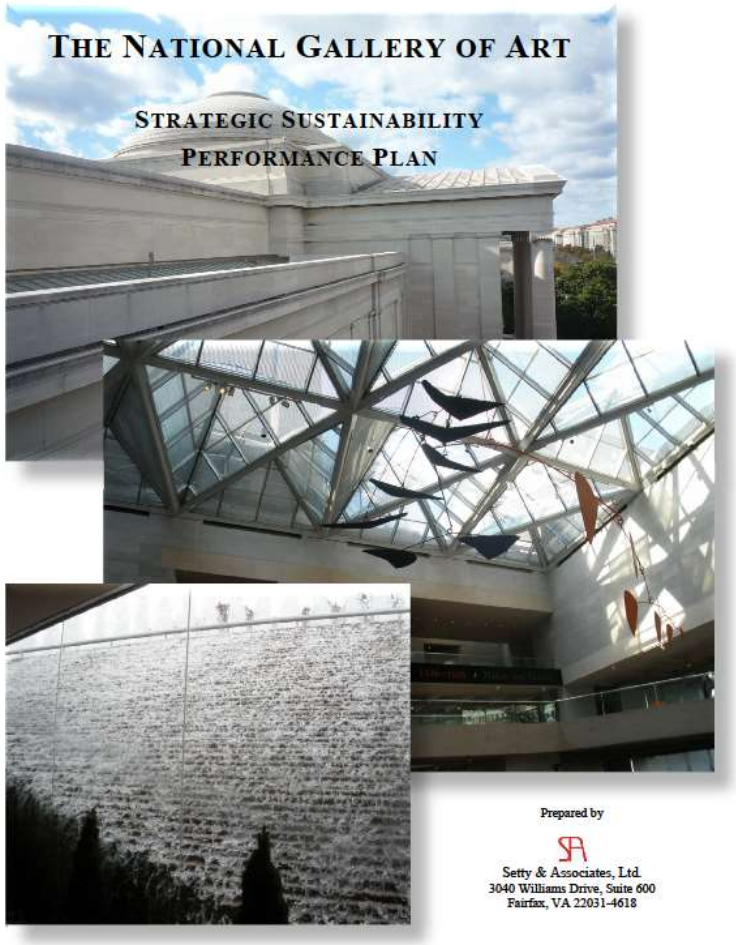
- **30% reduction** in **energy consumption** by 2015

EO 13514

- **28% reduction** in **GHG building emissions** by 2020

Develop a Plan of Action

Fruit: Use Subject Matter Experts

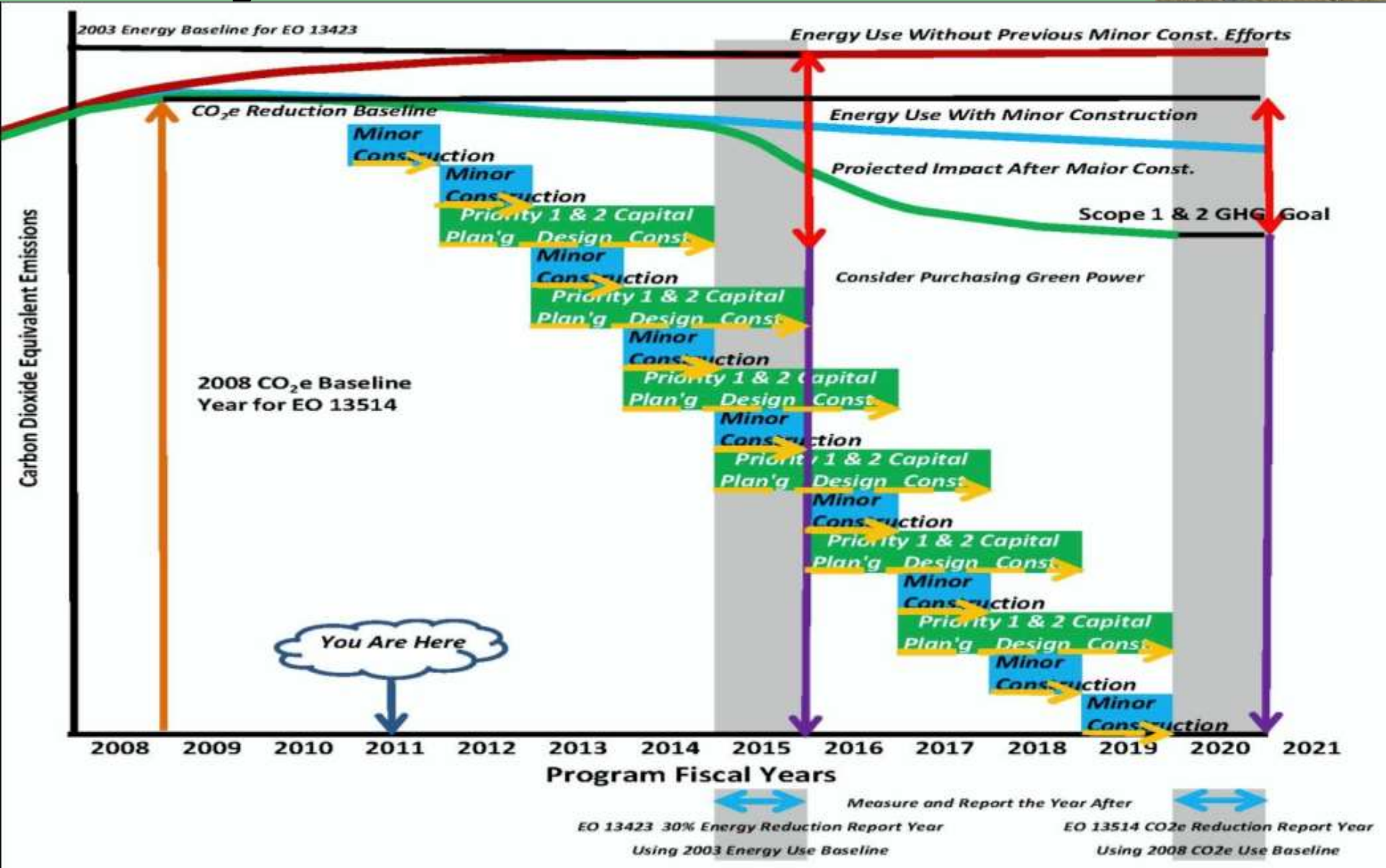


"20/20 by 2020"

20% reduction in energy consumption

20% reduction in GHG emissions

Work Within Budget System & Constraints



Understand the Big Picture

C.15.8 Whole Complex Perspective

Develop and Design Energy Conservation Measures

THE NATIONAL GALLERY OF ART — STRATEGIC SUSTAINABILITY PERFORMANCE PLAN

FINAL SUBMISSION

Water Conservation and Renewable Energy Measures generally fit into the following (Green) and (Purple) text box work categories, respectively. Commissioning conservation measures can generally be classified within the red box concept categories.

Possible Water Conservation Measures

Commissioning Conservation Measures

Possible Renewable Energy Concepts

Figure 7.3: General Conservation Concepts Considered

1 Low Cost, High Prog. Goal Gain	3 High Cost, High Prog. Goal Gain
2 Low Cost, Low Prog. Goal Gain	4 High Cost, Low Prog. Goal Gain

Figure 7.4: Pain – Gain Index

Design and Develop Energy Conservation Measures

1. Sculpture Garden Pavilion
2. Gallery Lighting Retrofit
3. Continuous Commissioning (CCX)
4. Cascades Café – EAC 33 and EAC 34 Renovations
5. Air Filtration Retrofit
6. Steam Metering
7. Power Shaver

Don’t Be Afraid to Reach for the High Fruit

Adding a 4th Heat Exchanger and De-Rating a 3rd

6,000 gpm -
3,500 gpm

6,000 gpm -
3,500 gpm

6,000 gpm -
3,500 gpm

SEQUENCE
10,500 gpm
7,000 gpm
3,500 gpm

6,000 gpm -
3,500 gpm

6,000 gpm -
3,500 gpm

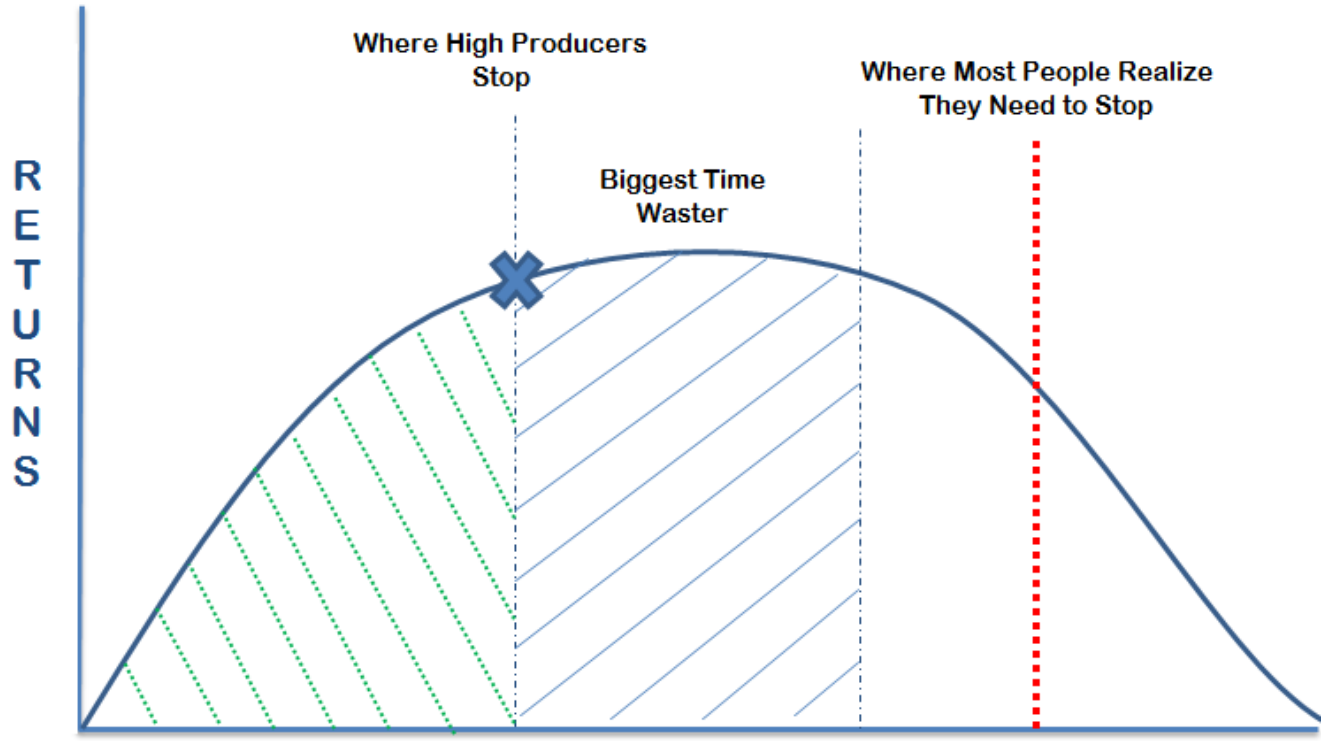
3,500 gpm -
2,500 gpm

2,500 gpm -
1,000 gpm

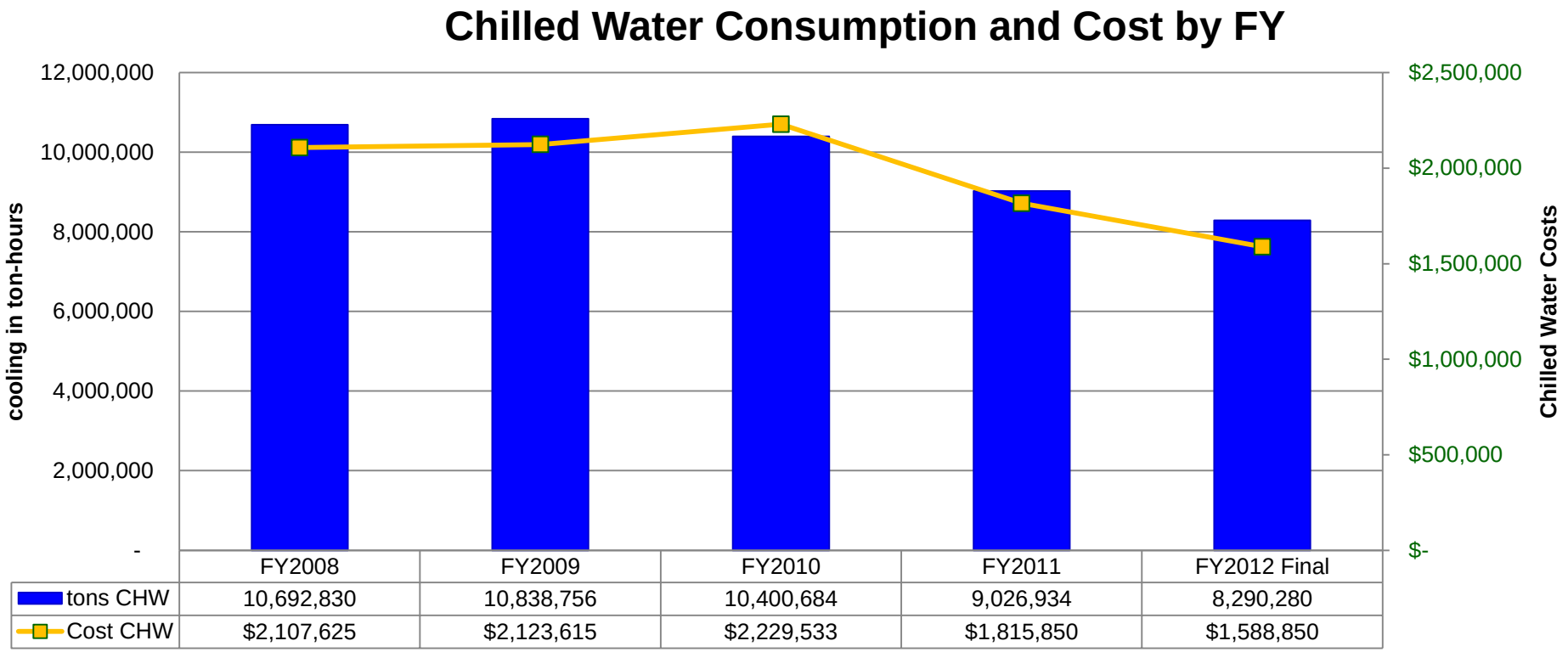
SEQUENCE
10,500 gpm
9,500 gpm
8,000 gpm
7,000 gpm
6,000 gpm
4,500 gpm
3,500 gpm
2,500 gpm
1,000 gpm

Know When to Stop Reaching

Law of Diminishing Returns

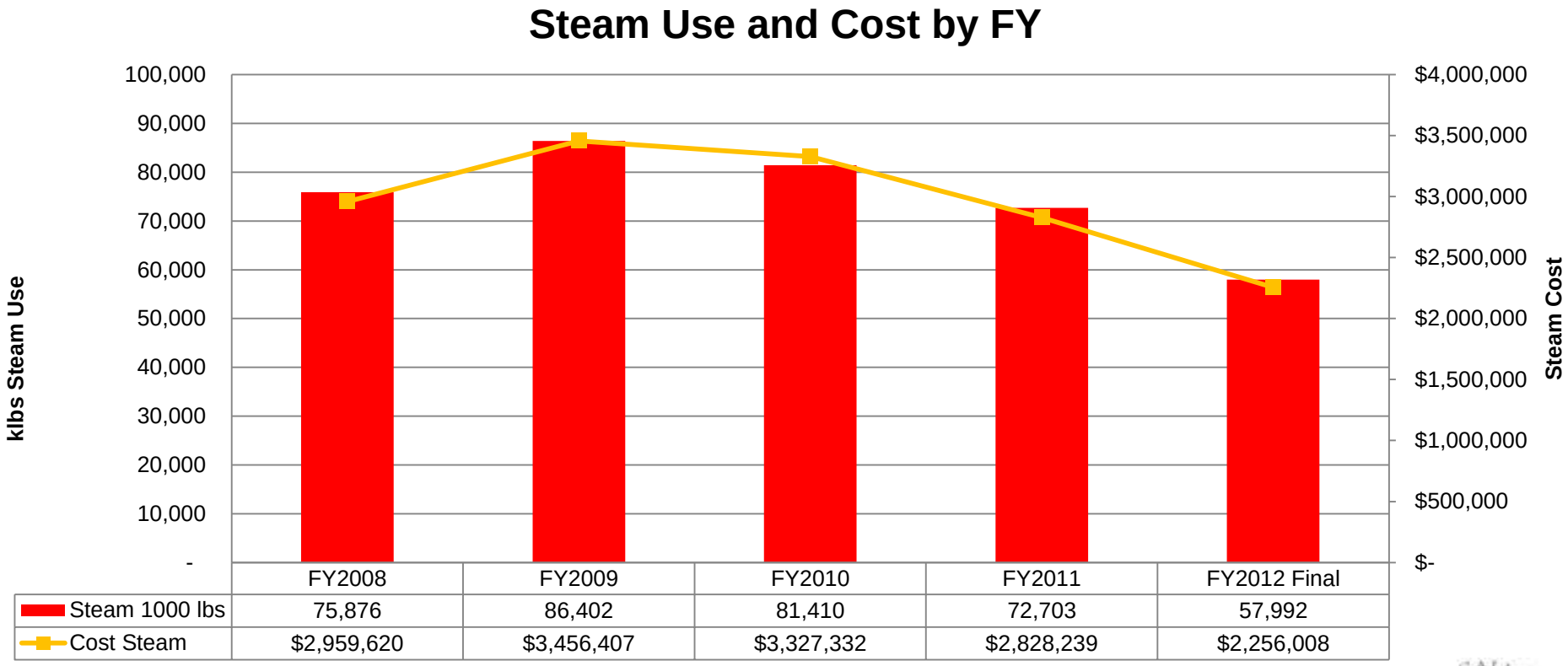


Measure and Trend Results



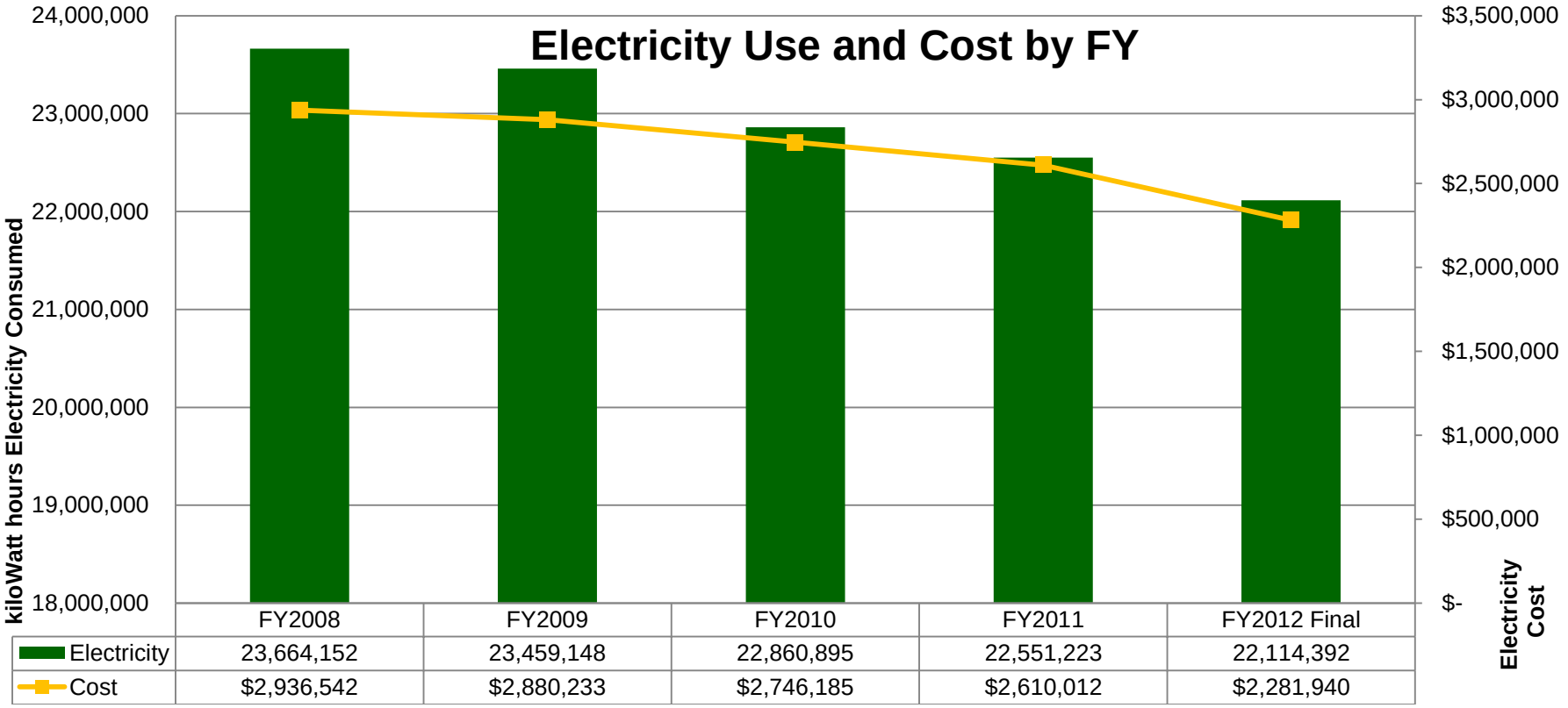
	FY2008	FY2009	FY2010	FY2011	FY2012 Final
tons CHW	10,692,830	10,838,756	10,400,684	9,026,934	8,290,280
Cost CHW	$2,107,625	$2,123,615	$2,229,533	$1,815,850	$1,588,850

Measure and Trend Results



	FY2008	FY2009	FY2010	FY2011	FY2012 Final
Steam 1000 lbs	75,876	86,402	81,410	72,703	57,992
Cost Steam	$2,959,620	$3,456,407	$3,327,332	$2,828,239	$2,256,008

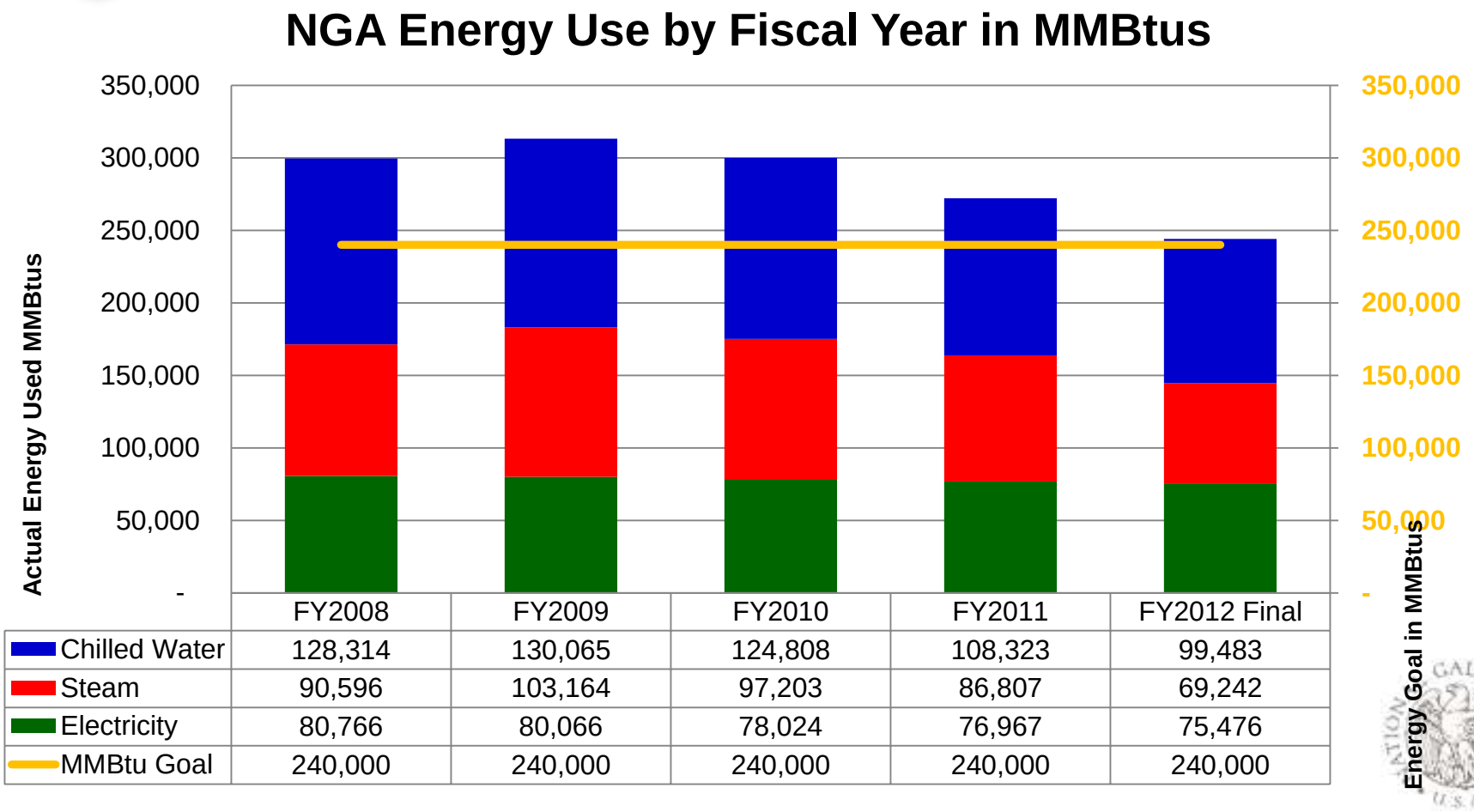
Measure and Trend Results



	FY2008	FY2009	FY2010	FY2011	FY2012 Final
Electricity	23,664,152	23,459,148	22,860,895	22,551,223	22,114,392
Cost	$2,936,542	$2,880,233	$2,746,185	$2,610,012	$2,281,940

Determine if Reaching Energy Costs Targets

Fruit: Track Success with KPI's

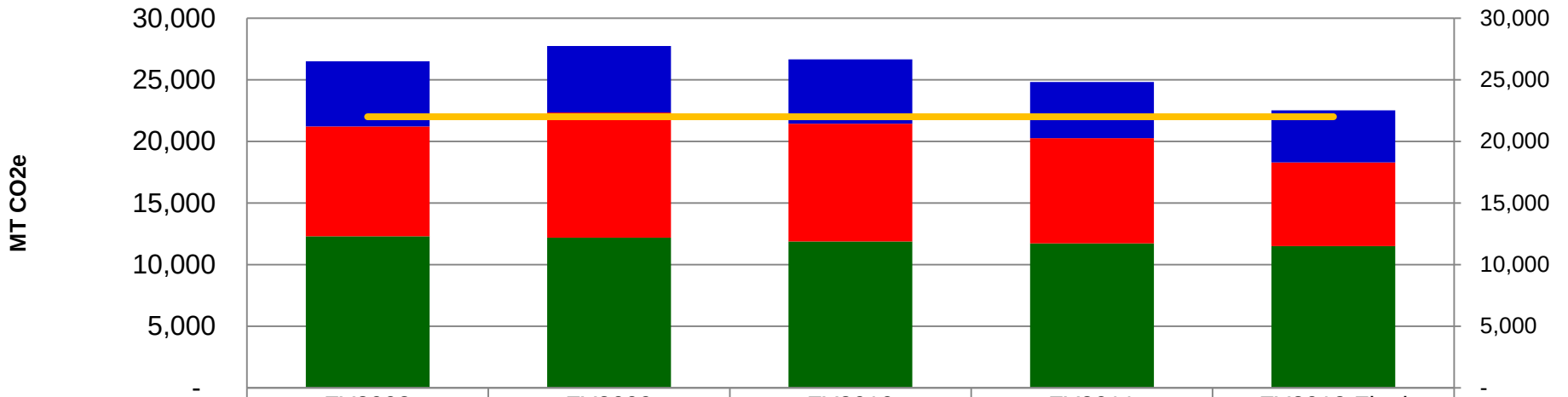


	FY2008	FY2009	FY2010	FY2011	FY2012 Final
Chilled Water	128,314	130,065	124,808	108,323	99,483
Steam	90,596	103,164	97,203	86,807	69,242
Electricity	80,766	80,066	78,024	76,967	75,476
MMBtu Goal	240,000	240,000	240,000	240,000	240,000

Determine if Reaching Energy Costs Targets

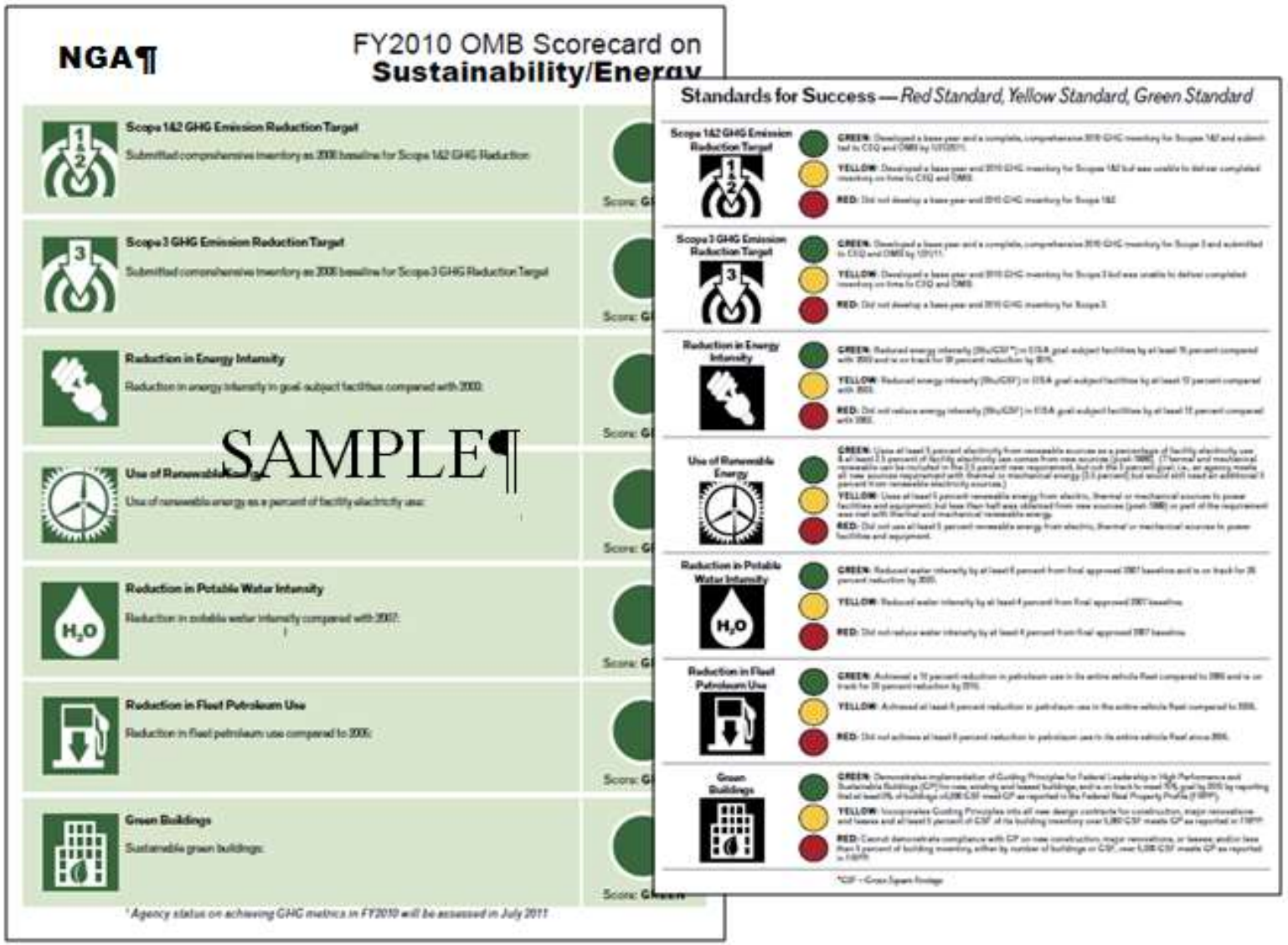
Fruit: Track Success with KPI's

NGA Greenhouse Gas Emissions in Metric Tons Carbon Dioxide equivalents (MT CO_2e): Goal - 20% Reduction by 2020



	FY2008	FY2009	FY2010	FY2011	FY2012 Final
GHG-CHW	5,294	5,401	5,217	4,557	4,212
GHG-Steam	8,905	10,140	9,554	8,533	6,806
GHG Electricity	12,296	12,189	11,878	11,717	11,490
GHG Goal	22,000	22,000	22,000	22,000	22,000

Measure Against Similar Agencies



NGA¶

FY2010 OMB Scorecard on **Sustainability/Energy**

Scope 1&2 GHG Emission Reduction Target

Submitted comprehensive inventory as 2008 baseline for Scope 1&2 GHG Reduction

Score: G

Scope 3 GHG Emission Reduction Target

Submitted comprehensive inventory as 2008 baseline for Scope 3 GHG Reduction Target

Score: G

Reduction in Energy Intensity

Reduction in energy intensity in goal subject facilities compared with 2003:

Score: G

SAMPLE¶

Use of Renewable Energy

Use of renewable energy as a percent of facility electricity use:

Score: G

Reduction in Potable Water Intensity

Reduction in potable water intensity compared with 2007:

Score: G

Reduction in Fleet Petroleum Use

Reduction in fleet petroleum use compared to 2005:

Score: G

Green Buildings

Sustainable green buildings:

Score: G

*Agency status on achieving GHG metrics in FY2010 will be assessed in July 2011

Standards for Success — *Red Standard, Yellow Standard, Green Standard*

Scope 1&2 GHG Emission Reduction Target

GREEN: Developed a base year and a complete, comprehensive 2010 GHG inventory for Scope 1&2 and submitted to CEQ and OMB by 12/2011.

YELLOW: Developed a base year and 2010 GHG inventory for Scope 1&2 but was unable to deliver completed inventory on time to CEQ and OMB.

RED: Did not develop a base year and 2010 GHG inventory for Scope 1&2.

Scope 3 GHG Emission Reduction Target

GREEN: Developed a base year and a complete, comprehensive 2010 GHG inventory for Scope 3 and submitted to CEQ and OMB by 12/2011.

YELLOW: Developed a base year and 2010 GHG inventory for Scope 3 but was unable to deliver completed inventory on time to CEQ and OMB.

RED: Did not develop a base year and 2010 GHG inventory for Scope 3.

Reduction in Energy Intensity

GREEN: Reduced energy intensity [Btu/GSF*] in 3 GSA goal subject facilities by at least 15 percent compared with 2003 and is on track for 30 percent reduction by 2015.

YELLOW: Reduced energy intensity [Btu/GSF] in 3 GSA goal subject facilities by at least 12 percent compared with 2003.

RED: Did not reduce energy intensity [Btu/GSF] in 3 GSA goal subject facilities by at least 12 percent compared with 2003.

Use of Renewable Energy

GREEN: Used at least 5 percent electricity from renewable sources as a percentage of facility electricity use. 6 of at least 7.5 percent of facility electricity use comes from new sources (post-1999). (7 biomass and renewable can be included in the 7.5 percent new requirement, but not the 5 percent goal; i.e., an agency meets all new sources requirement with thermal or mechanical energy (3.5 percent) but would still need an additional 5 percent from renewable electricity sources.)

YELLOW: Used at least 5 percent renewable energy from electric, thermal or mechanical sources to power facilities and equipment; but less than half was obtained from new sources (post-1999) or part of the requirement was met with thermal and mechanical renewable energy.

RED: Did not use at least 5 percent renewable energy from electric, thermal or mechanical sources to power facilities and equipment.

Reduction in Potable Water Intensity

GREEN: Reduced water intensity by at least 8 percent from final approved 2007 baseline and is on track for 26 percent reduction by 2020.

YELLOW: Reduced water intensity by at least 4 percent from final approved 2007 baseline.

RED: Did not reduce water intensity by at least 4 percent from final approved 2007 baseline.

Reduction in Fleet Petroleum Use

GREEN: Achieved a 10 percent reduction in petroleum use in its entire vehicle fleet compared to 2005 and is on track for 20 percent reduction by 2015.

YELLOW: Achieved at least 5 percent reduction in petroleum use in the entire vehicle fleet compared to 2005.

RED: Did not achieve at least 5 percent reduction in petroleum use in its entire vehicle fleet since 2005.

Green Buildings

GREEN: Demonstrates implementation of Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (GP) for new, existing and leased buildings, and is on track to meet 15% goal by 2015 by reporting that at least 5% of buildings >5,000 GSF meet GP as reported in the Federal Real Property Profile (FRPP).

YELLOW: Incorporates Guiding Principles into all new design contracts for construction, major renovations and leases and all least 5 percent of GSF of its building inventory over 5,000 GSF meets GP as reported in FRPP.

RED: Cannot demonstrate compliance with GP on new construction, major renovations, or leases, and/or less than 5 percent of building inventory, either by number of buildings or GSF, over 5,000 GSF meets GP as reported in FRPP.

*GSF = Gross Square Footage

Best Practices to Meet Mission and Energy Costs Targets

Fruit: Spread the Good News

NATIONAL GALLERY OF ART

AFM-Sustainability & Special Projects Office

Memorandum

Topic: Recycling at the National Gallery of Art Date: March 6, 2012

Reduce, Reuse & Recycle

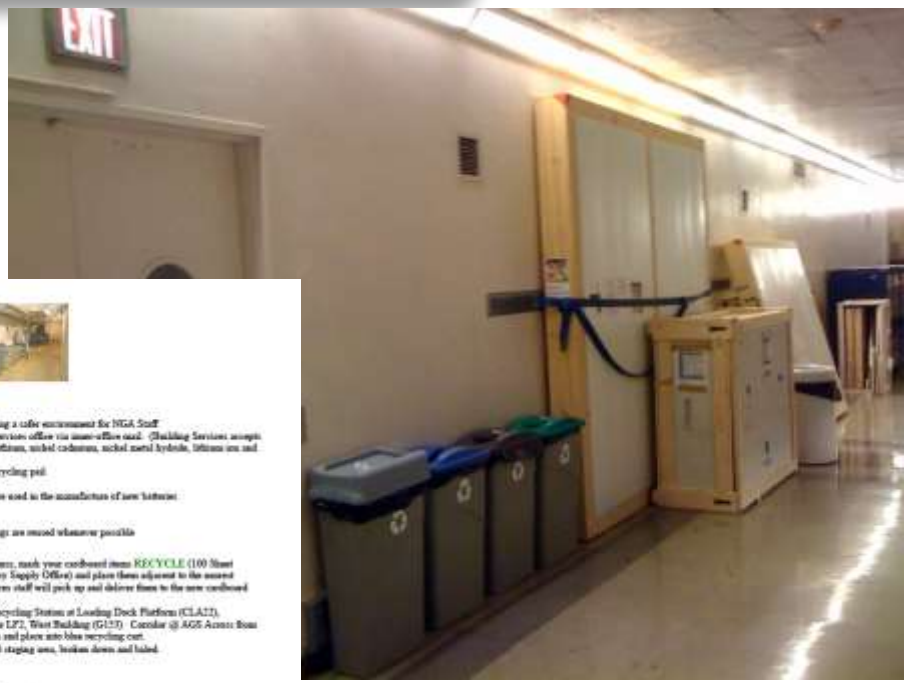
Recycling opportunities (see reverse for more details):

- Batteries – alkaline, nickel cadmium, and more
- Building materials – doors, sinks, toilets, etc.
- Cardboard, including corrugated
- Construction materials – construction, demolition, renovation
- Containers – aluminum cans, glass and plastic bottles, food containers
- Cooking oil
- Electronics
- Florescent lamps – CFL, tubes
- Metal – scrap
- Paper – glossy, brochures, newsprint, copier paper – all paper
- Plastics – acrylic sheeting, ABS, nylon, polyethylene sheeting
- Toner cartridges
- Wood – scrap, pallets

- The Gallery currently recycles **batteries**, **cardboard, containers (plastic and glass)**, **florescent lamps** and **paper**.

  Note: **All types of paper are recyclable**; this includes brochures, maps, color and white.

- Food Service contractors recycle **cardboard**, **containers** and **cooking oil**.
- Reuse **building materials** as appropriate.
- Recycling of **construction materials** is stipulated and included in AAE and AFM contracts.
- The Gallery will occasionally recycle **Metal** and **Wood** based on volume.



Details of Current Recycling Efforts at NGA:

Batteries:
Recycling batteries has the important benefit of providing a safer environment for NGA Staff.

- Gallery staff sends used batteries to the Building Services office via inter-office mail. (Building Services accepts the following types of batteries: alkaline, primary lithium, nickel cadmium, nickel metal hydride, lithium ion and small sealed lead acid batteries)
- Building Services staff places batteries into 35 lb recycling pail.
- Filled recycling pail is mailed to Battery Solutions.
- Battery Solutions sorts batteries; sorted materials are used in the manufacture of new batteries.

Building materials:

- Architectural components and fixtures of the buildings are reused whenever possible.

Cardboard:

- From your EB, WB or CL office: At close of business, stash your cardboard items RECYCLE (100 Sheet "RECYCLE" tablets are now available at the Gallery Supply Office) and place them adjacent to the nearest corridor without blocking corridor. Building Services staff will pick up and deliver them to the new cardboard baler area for processing.
- Or take your cardboard to the nearest Cardboard Recycling Station at Loading Dock Platform (CLA22), CL Basement (CLB7) – adjacent to Freight Elevator LF2, West Building (G15J) Corridor @ AGS Access from the trash compactor enclosure. Break down boxes and place into blue recycling cart.
- Cardboard collected by AFM-BS, delivered to CLB staging area, broken down and baled.

Construction materials:
Continue to include in AFM & AAE contracts.

Cooking Oil – Restaurant Associates (RA) – Gallery Restaurants:

- Used cooking oil is collected in containers by RA Staff and taken to the CLB RA cage each night.
- RA's vendor, Valley Protein Co. Inc., collects the used cooking oil once a week. Used oil is refined & auto bathed.

Glass and Plastic Containers & Paper:

- Items are dispersed by Gallery staff at four recycling stations: WBG162 (Lounge), EBSC30 (EP), 4&5 Lobby), CLA17 (Vending @ AOP), CLB16 (Vending @McDonalds).
- Building Services empties containers and transports items to CLB area for staging.
- Restaurant Associates: separate glass and plastic bottles at tray return area, put in plastic bags and take to CLB staging area.
- All paper is recyclable. White paper (copier/printer) collected by Gallery Staff in small office boxes and dumped into large printer station boxes. Building Services Staff empties printer station boxes and transports paper to CLB cage for staging.
- Georgetown Paper Stock Co. picks up collected materials once a week.

Florescent Lamps:
Recycling florescent lamps has the important benefit of providing a safer environment for NGA Staff.

- AFM Electric Shop repackages used florescent tubes in old boxes.
- Electric Shop transports packaged lamps to CLA1 (Garage Storage Room).
- AFM Vendor (Bay Lighting), picks up old lamps and recycles them.

Acrylic – Plastics:
Conservation initiated acrylic recycling with their vendor. DCL and DID participate.

Guest Services International (GSI), Sculpture Garden Pavilion:
Contract stipulates recycling of containers and cardboard. These items are collected and picked up by GSI's vendor.

Best Practices to Meet Mission and Energy Costs Targets

- Fruit: Track Success With KPI's
- Fruit: Add Metering and Sub-Metering
- Fruit: Look for Free or Inexpensive Training
- Fruit: Alignment of Vision, Mission, and Goals
- Fruit: Convert Lights to Lower Energy Use Lights
- Fruit: Establish a Sustainability Office
- Fruit: Use Subject Matter Experts
- Fruit: Align HVAC Use With Occupancy
- Fruit: Use Daylighting Where Possible
- Fruit: Schedule Work During Regular Shift Hours
- Fruit: Conduct Regular Energy Audits to Check the Condition and Efficiency of Your Equipment
- Fruit: Use New Sustainable Technology in Daily Business
- Fruit: Know Where You Are Spending in Your Facilities
- Fruit: Benchmark Against Other Like Facilities
- Fruit: Good Communications Between Gallery Staffs
- Fruit: Buy Energy Efficient Equipment
- Network with Others in Profession
- Fruit: Be Creative with HVAC Schedules
- Fruit: Spread the Good News

Federal Facilities Council

Thank you!

"Best Practices to Meet Mission and Energy Costs Targets"

David Samec, P.E., CFM
Chief of Facilities Management

June 12, 2013