How To Develop an Energy Management Master Plan for Your Hospital or Healthcare System

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GRUMMAN|BUTKUS
ENERGY EFFICIENCY CONSULTANTS
AND SUSTAINABLE DESIGN ENGINEERS

HEALTHCARE ENGINEERS SOCIETY OF NORTHERN ILLINOIS
HESNI

Your Presenter

- Dan Doyle, PE, Fellow ASHRAE, is the Chairman of Grumman|Butkus Associates, a firm of energy efficiency consultants and sustainable design engineers
- For 40+ years, Dan's career has focused on energy conservation and efficiency improvements in new and existing buildings, especially energy-intensive and mission critical facilities, such as hospitals, laboratories, data centers, and specialized manufacturing facilities
- Dan is a frequent public speaker on energy/water efficiency and sustainability topics and is active in multiple professional associations

This Presentation Will Discuss…

- **Why** we need to reduce our energy consumption and GHG emissions
- How conversations surrounding energy efficiency are changing
- 14 steps of a comprehensive energy management plan for healthcare facilities
- The high potential return on investment related to reducing healthcare facility energy costs
- Benchmarking options and appropriate responses to findings

This Presentation Will Discuss…

- RCx/MBCx and retrofit options for hospitals
- Why integrating energy efficiency with capital planning, new construction, and purchasing is vital
- How to leverage local grant/rebate opportunities to pay for studies and upgrades
- Alternative financing options for energy efficiency and renewable energy projects

Discussions About Energy Efficiency Have Changed Dramatically During Just the Past Two Years

- More focus on reducing carbon emissions and electrifying buildings
- Evolving discussions with healthcare clients:
  - Carbon reduction plans instead of energy efficiency plans
  - Big healthcare systems are pursuing 100% of electricity supplied from renewable sources
  - Much more interest in water conservation and other “sustainability” initiatives instead of just energy

Discussions About Energy Efficiency Have Changed Dramatically During Just the Past Two Years

- “If we do not achieve a 45 to 55% reduction in total global emissions by 2030, we will have lost the opportunity to meet the 1.5°C/2°C warming threshold, and climate change will become irreversible.” — Architecture 2030
- The Biden administration’s GHG reduction targets:
  - Reduce GHG emissions by 50 to 52% by 2030 (from a 2005 baseline)
  - Net-zero carbon by 2050

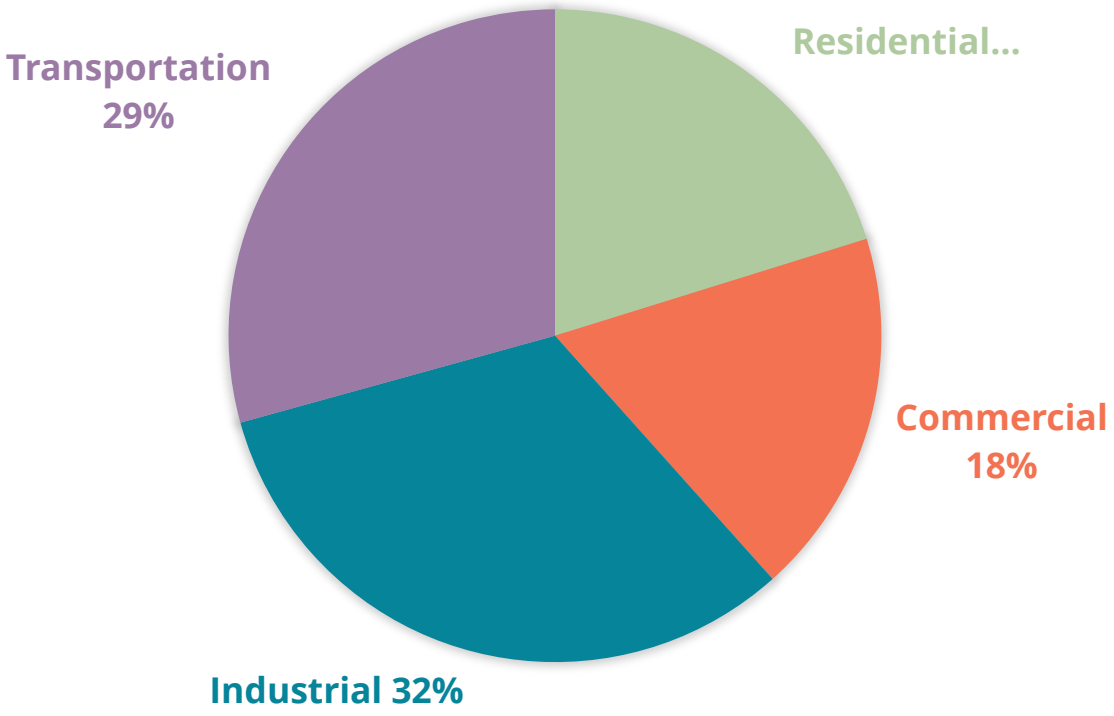
Discussions About Energy Efficiency Have Changed Dramatically During Just the Past Two Years

- New SEC regulations will treat Environmental, Social, and Governance (ESG) metrics as fiduciary data
  - Pressure from boards/shareholders
- Largest companies are requiring suppliers to make significant emissions reductions (Scope 2 & 3 emissions)
- Several cities have enacted, or are contemplating, compulsory Building Performance Standard (BPS) ordinances
  - BIG financial penalties for poor energy efficiency

We Are Closer to Meeting the Biden Targets Than One Might Think

- Have already replaced lots of coal power plant capacity with natural gas peakers
- U.S. banning the use of HCFCs – will pressure China/India to do same
  - HCFCs have global warming potential (GWP) 12,000 times higher than CO_2
  - China and India still producing HCFCs in spite of denials
- Reinstating methane leakage rules dumped by Trump
  - CH4 GWP is 86 times that of CO_2
- Replacing remaining aging coal power plants could reduce GHG by 17% of 2019 total
  - Wind/PVs are now cheapest new capacity
- Electrifying significant portion of vehicles will help
  - Ford is electrifying the F-150 pick-up truck, largest selling vehicle in the US
- Buildings account for 40% of energy use: largest segment of our economy

Share Of Total Energy Consumption By End-use Sectors, 2018



Source: U.S. Energy Information Administration, Monthly Energy Review, Table 2.1, April 2018

- Why are buildings important?
  - Buildings account for nearly 38% of U.S. energy use: the largest segment of our economy…
- Hospitals are one of the most energy-intensive facilities
  - Use three times more energy per square foot than office buildings due to:
  - 24/7/365 occupancy
  - Demands for high airflow, filtration
  - Lots of energy-consuming equipment (MRIs, PET scans, etc.)

Hospitals Are Energy-Intensive Facilities

"If the US healthcare system were a country, it would rank 13th in the world for greenhouse gas emissions."

"EPA estimates that the U.S. healthcare sector's current annual electricity use of 73 trillion kilowatt hours (kWh) contributes $600 million per year to healthcare costs via increased asthma and other respiratory illnesses."

Reducing energy usage

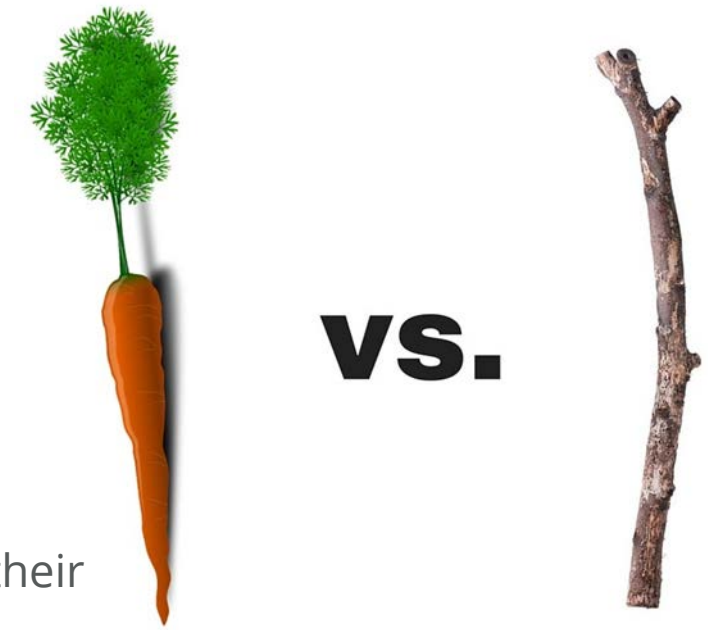
reduces a hospital's operational costs

and

reduces a hospital's carbon footprint

Game Changer: Moving From Carrots to Sticks?

- Generous utility incentive programs (carrots) have been around for more than a decade in most places … these programs have not led to the deep cuts in energy use necessary to meet IPCC guidance or federal gov's goals
- NYC's Local Law 97 compels mandatory cuts in energy use — facilities will face large fines (sticks) if they do not meet targets
  - St Louis, Washington, DC, and Boston have recently enacted their own building energy performance standard (BPS) legislation
  - Many other large cities, including Chicago, are contemplating following suit: nationalbpscoalition.org
  - Will your city or state do the same? It's best to have a plan, just in case…



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White House pledge from the Office of Climate Change and Health Equity (OCCHE)

"Climate change represents a major threat to human health in the coming century with particularly acute impacts for people that have been marginalized around the world and across the United States. Stakeholders in the U.S. health care system – including hospitals, health systems, payers, suppliers and pharmaceutical companies - must lead the response to this crisis through their example and through preparedness to meet the catastrophic and chronic challenges to come. We must rapidly develop approaches to care that meet the climate health needs of disproportionately affected patients and families, and we must just as rapidly reduce our contributions to the greenhouse gas emissions that are threatening life on the planet."

White House/OCCHE Goals

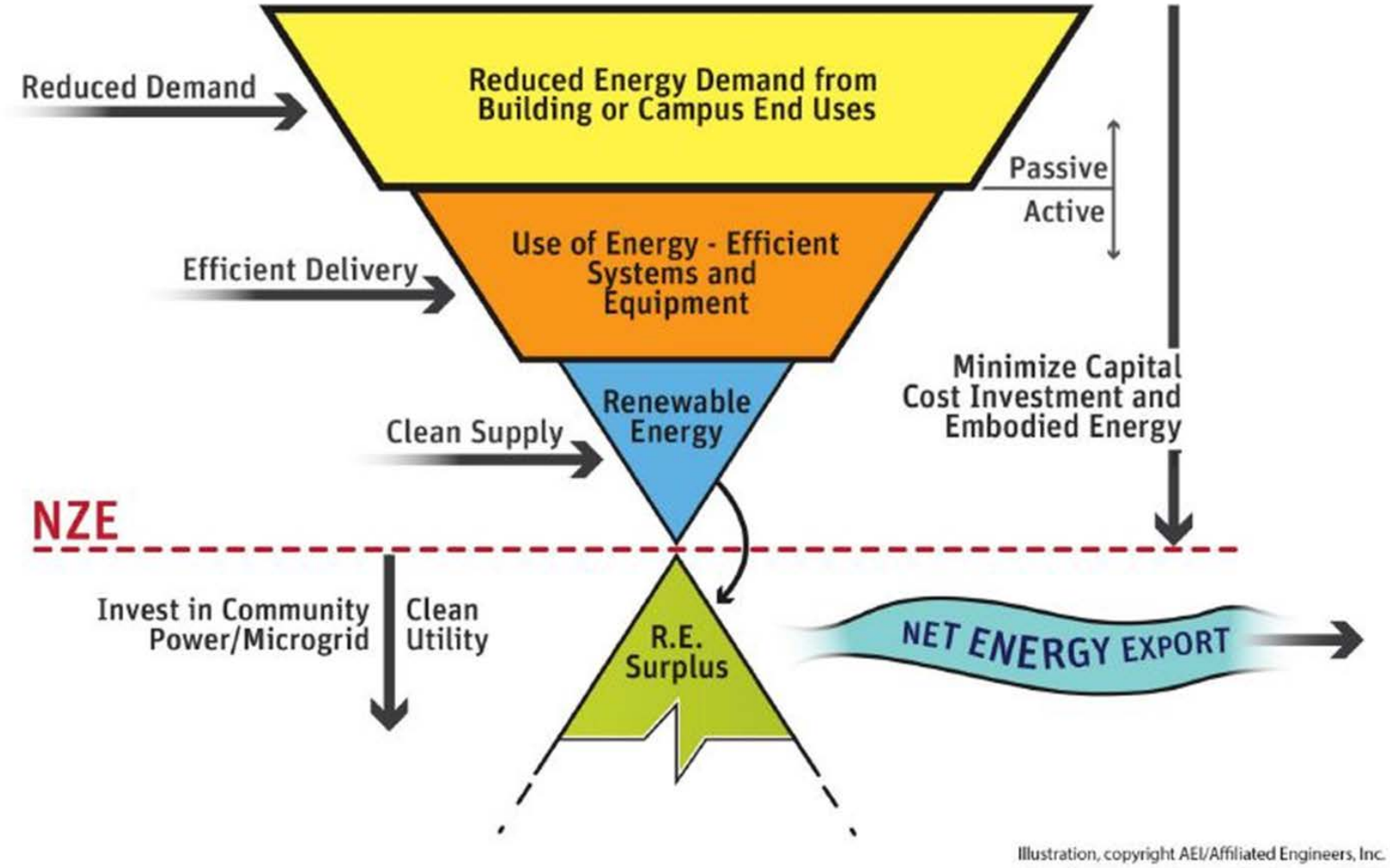
What are the White House/OCCHE looking for from hospitals?

1. Reduce organizational emissions by **50% by 2030** and **net-zero by 2050**
2. Designate an executive lead by 2023 and develop an inventory of Scope 3 (supply chain) emissions by the end of 2024
3. Develop and release a climate resilience plan for continuous operations by the end of 2023, anticipating the needs of groups in our community that experience disproportionate risk of climate-related harm
4. More than 60 healthcare systems have signed the OCCHE Pledge, including Advocate/Aurora, Ascension and the Rush Health System

Conservation Is Just A Start

- Must start de-carbonizing our facilities
  - Start by lowering total usage as much as possible through conservation measures (today's main topic)
  - Consider fuel-switching opportunities wherever possible – electrify everything
  - Look at both on-site and off-site renewable energy for electric power
    - Covering all roofs and parking with PVs may only get you to 5-10% of electric use
- Must also start incorporating resiliency features into our facilities to anticipate the changes coming due to climate change

The New Paradigm



Water and Energy Are Inextricably Linked

Reducing water consumption reduces energy use:

- The extraction, treatment, and delivery of water accounts for as much as 15% of energy consumption in some parts of the country
- Energy comprises 80% of a typical water bill

Reducing electricity and gas consumption saves water usage:

- Power plants use a lot of fresh water (45% of nationwide total), and nearly half of that evaporates (per latest U.S. Geological Survey water use report, 2010
- The production of natural gas by hydraulic fracturing uses large quantities of water

By increasing efficiency through water conservation and recycling practices, facilities can further cut energy consumption and thus carbon footprint

Focus on Reducing Energy Use

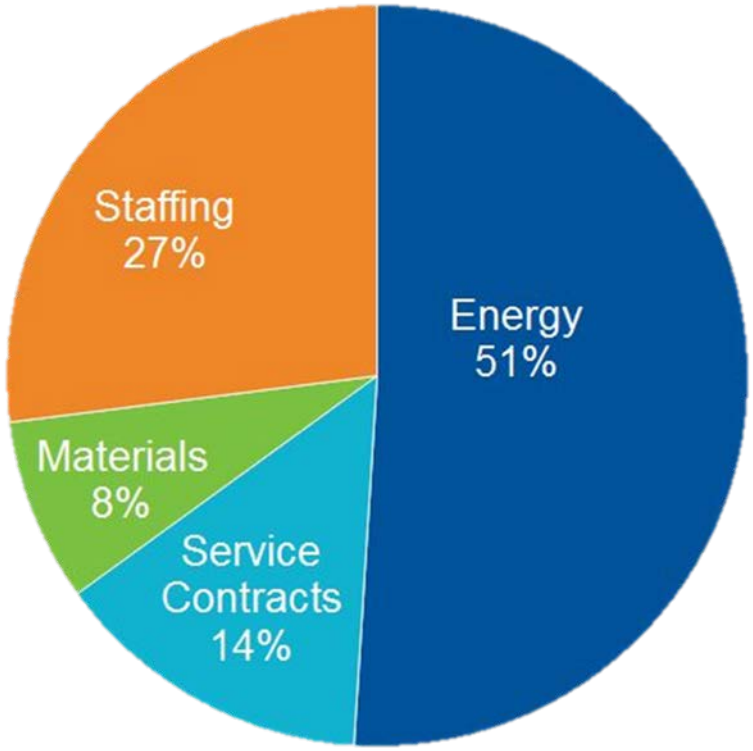
How do we move forward?

Energy represents more than half of the healthcare facility budget, according to benchmarking data from the American Society for Healthcare Engineering

That's more than staffing, materials, and service contracts combined

- Sell the financial case
- Address risk concerns

Reducing energy costs by 5% has same impact on bottom line as cutting staff by 10%



ASHE benchmarking data:
Cost breakdown of facility budgets

Financial Case:
Energy Efficiency Is a Good, Safe Investment

The opportunity:

- $100,000 reduction in energy costs is equivalent to $2 million in new revenues (assumes 5% ROS)
- Research by the EPA shows that hospitals that implement energy conservation measures (ECMs) outperform competing hospitals by as much as 10% in net operating income.[1]

1. EPA Study, "Boosting Your Bottom Line Through Improved Energy Use," June 2005

Address Risk Concerns

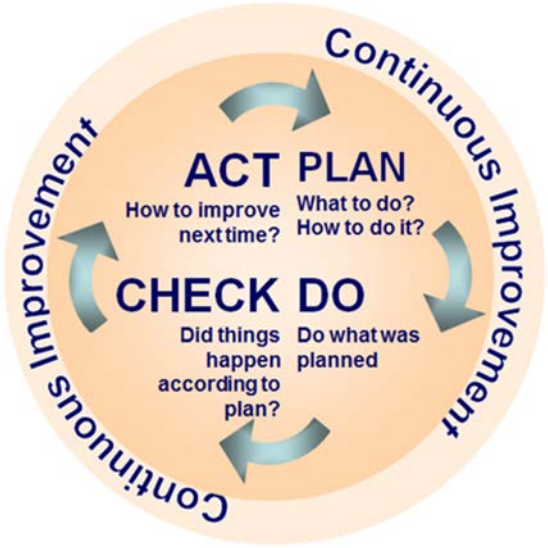
Stocks/bonds are not a sure thing (as we learned in 2008-09). Even real estate tanked.

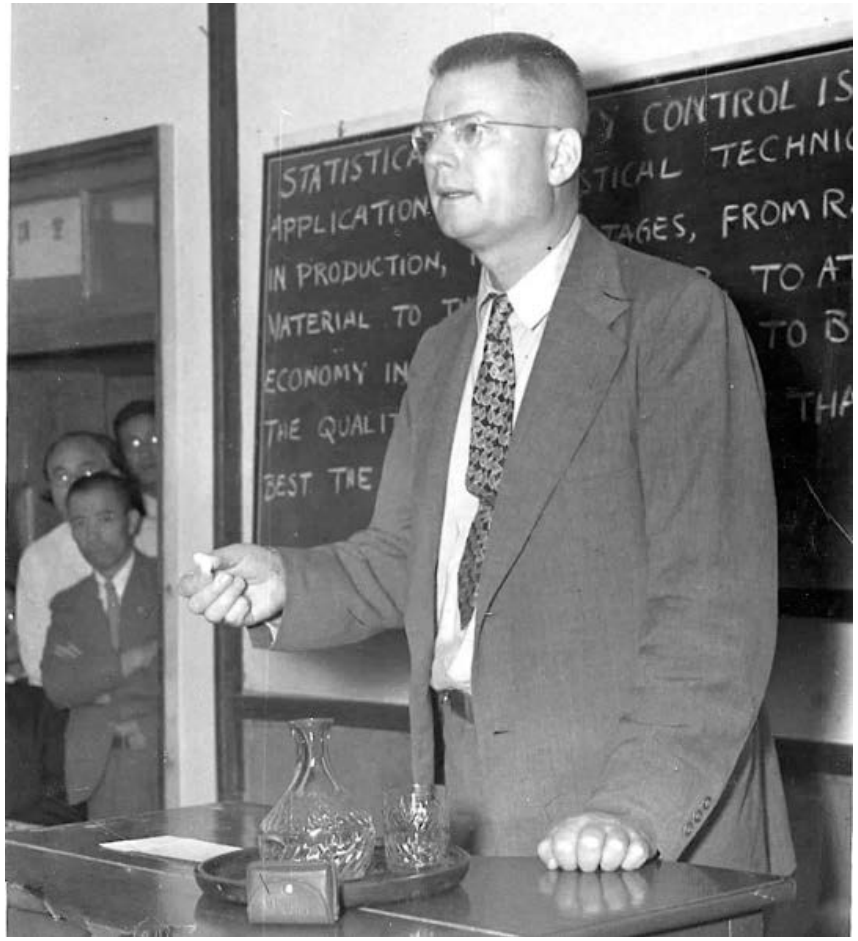
Energy efficiency measures are very low-risk investments.

- Use readily available, proven, off-the-shelf technology already installed in hundreds of other hospitals
- As energy prices go up, your savings will increase

Energy Efficiency: How Do We Move Forward?

- The most successful energy efficiency and sustainability programs are **“process-based”** instead of “project-based”
- Avoid the “project pitfall”

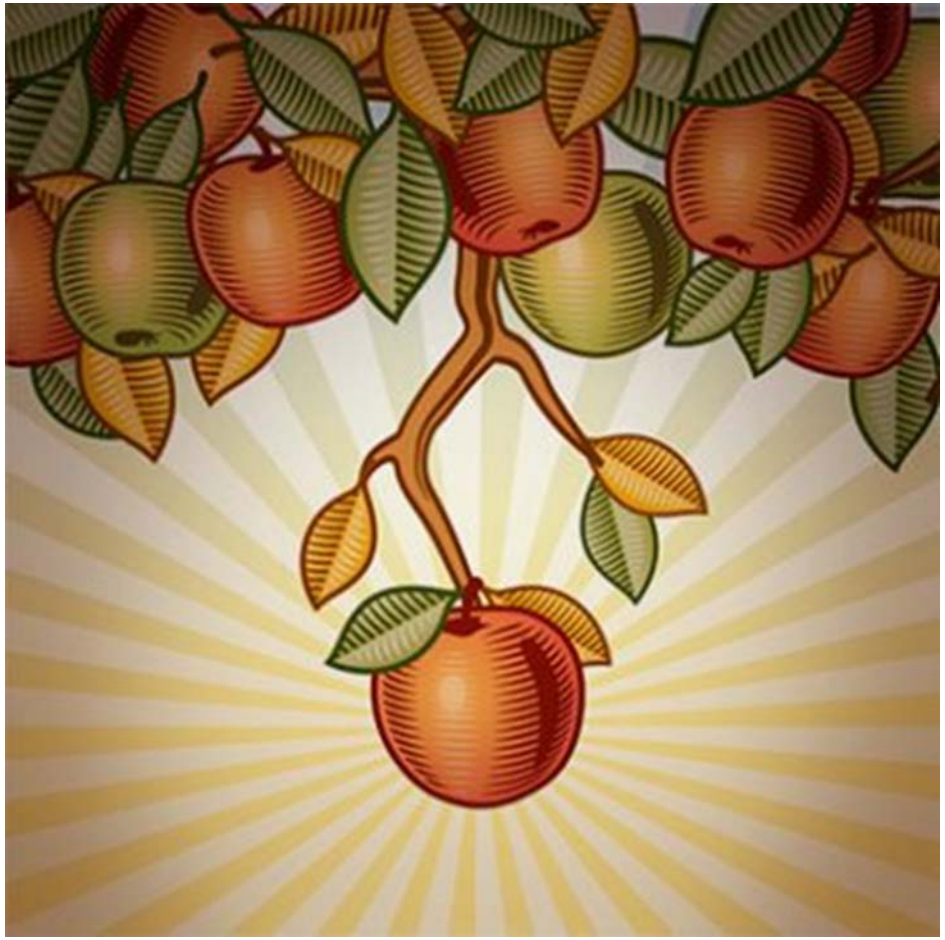




W. Edwards Deming

How Do We Move Forward?

- Develop a baseline, then…
- Shoot for an easy, quick win
  - Steam traps pay back in weeks
  - Retro-commissioning can pay back in months
  - Lighting can be one or two years



What Results Can You Expect?

- Implementing the “low-hanging fruit” will usually reduce energy use/costs by 5% to 10%
- Implementing the remaining longer-payback measures with an overall aggregate payback of up to seven years can typically help a facility achieve a total energy use/cost reduction of 20% to 25

- Further reductions can be gained by implementing a comprehensive “process,” resulting in long-term reductions of 30% to 50%
- Further de-carbonization will require electrification of building infrastructure coupled with on-site and/or off-site renewables

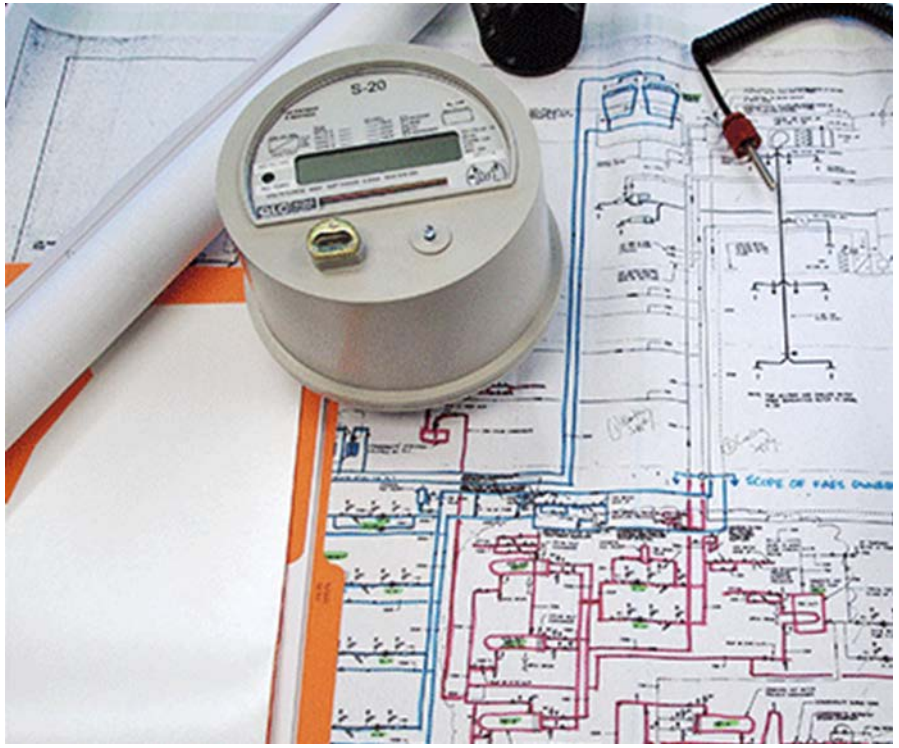
So, What Constitutes the Master Plan?

Comprehensive Approach:

- Utility tracking
- Benchmarking
- Optimize energy purchases/ supply-side management
- Look for low/no cost operations and maintenance savings
- Retro-commissioning (RCx) & MBCx/FDD
- Retrofit of existing building systems/equipment
- Incorporate building infrastructure planning into energy efficiency program
- Set ambitious targets for efficiency of new buildings, major additions, and renovations
- Incorporate LCC into equipment purchasing policies
- Look for fuel-switching opportunities to reduce GHG emissions – electrify everything
- Evaluate getting all electricity from renewable sources (comb. on-site & off-site)
- Maximize grant and rebate opportunities
- Leverage recognition opportunities to build management support
- Explore alternative financing options to fund program

Utility Tracking

- Establishing an accurate baseline and tracking system is essential
- Set up an energy dashboard tied to the BAS to generate reports
- Can use Urjanet for automated bill retrieval and data inputting.
  - o www.urjanet.com



Benchmarking: Why Track Water and Energy Use?

Is 10 MPG high or low for an automobile?

Answer: Common knowledge

Is 350 kBtu/sf/year high or low for a hospital?

Answer: ???

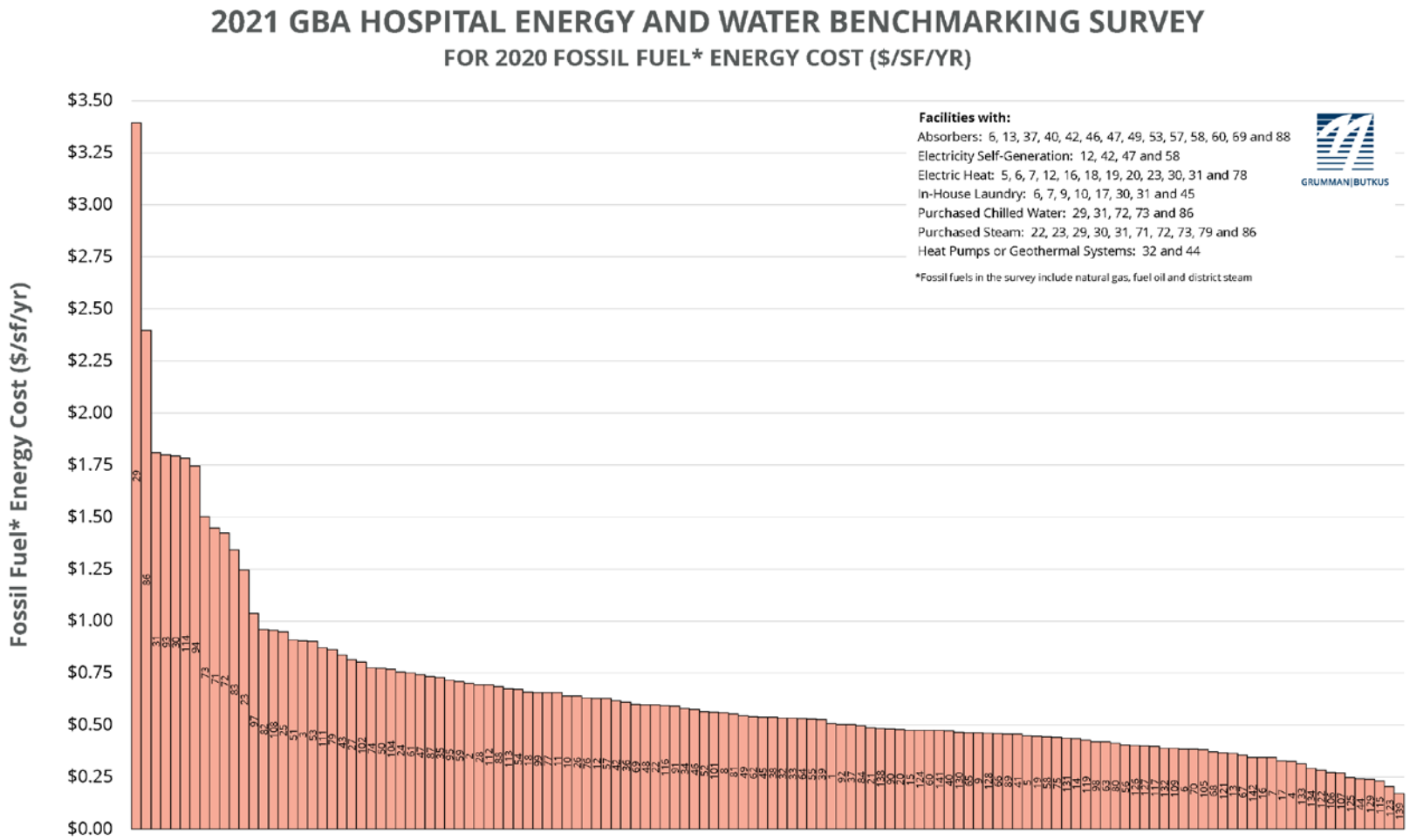
Benchmarking: Participate to the Fullest Extent Possible

- Participate in benchmarking to the fullest extent possible
- For energy, there are several good options:
  - EPA's ENERGY STAR
  - GBA's Annual Energy and Water Benchmarking Survey
    - http://grummanbutkus.com/why-we-excel/hospital-energy-water-survey
  - Practice Greenhealth's Benchmarking Survey
  - CBECS

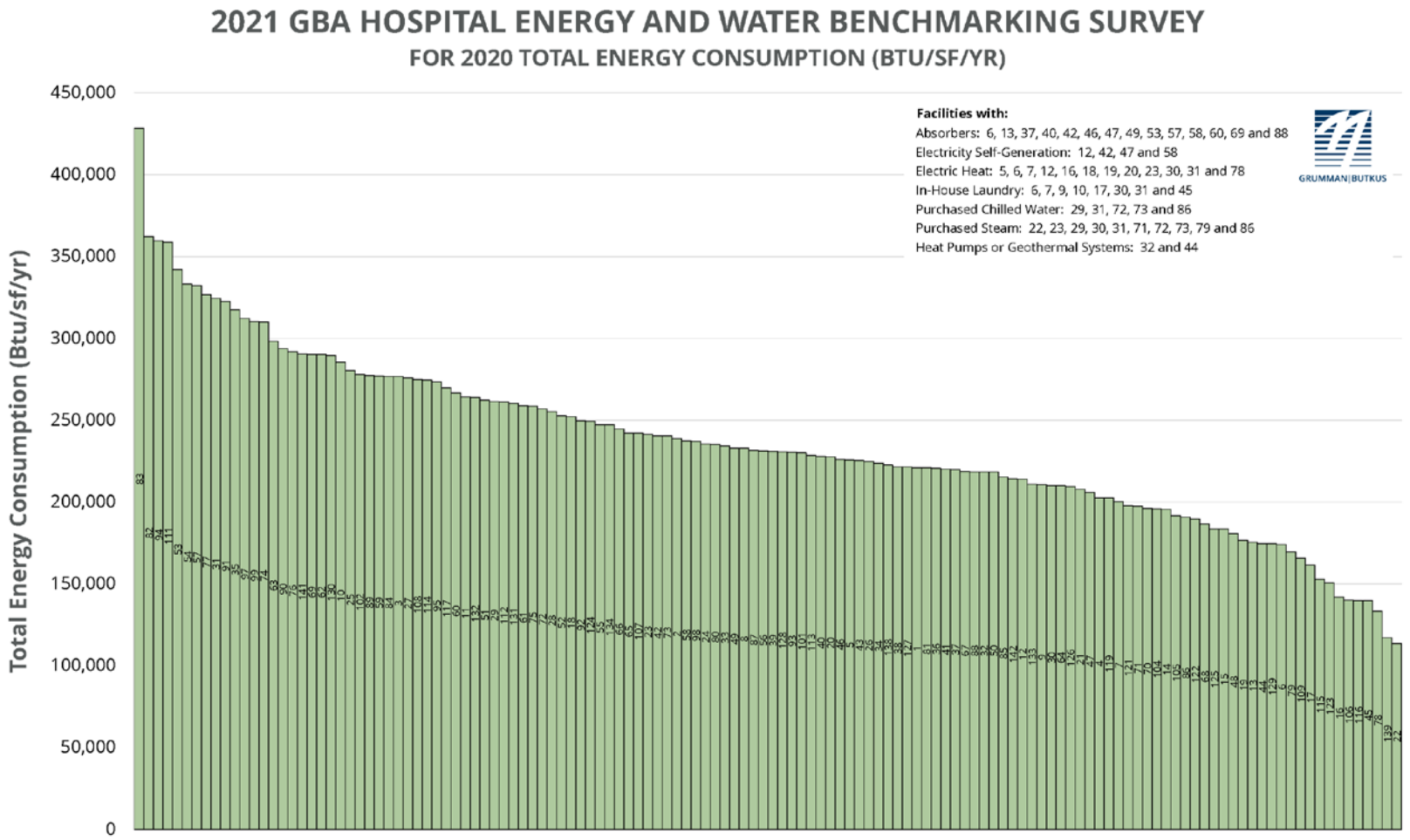
ENERGY STAR: What Is It?

- EPA's nationally recognized energy efficiency benchmarking tool for most building types
- Buildings receive a percentile rank (0 to 100)
- Results are partly normalized for weather (heating degree days are not normalized)
- Scores of 75 or above are eligible for the ENERGY STAR label
- Score of 69 or above eligible for LEED EB

GBA Benchmarking Survey: Gas Cost ($/sf/yr)



GBA Survey: Total Energy Use (Btu/sf/yr)



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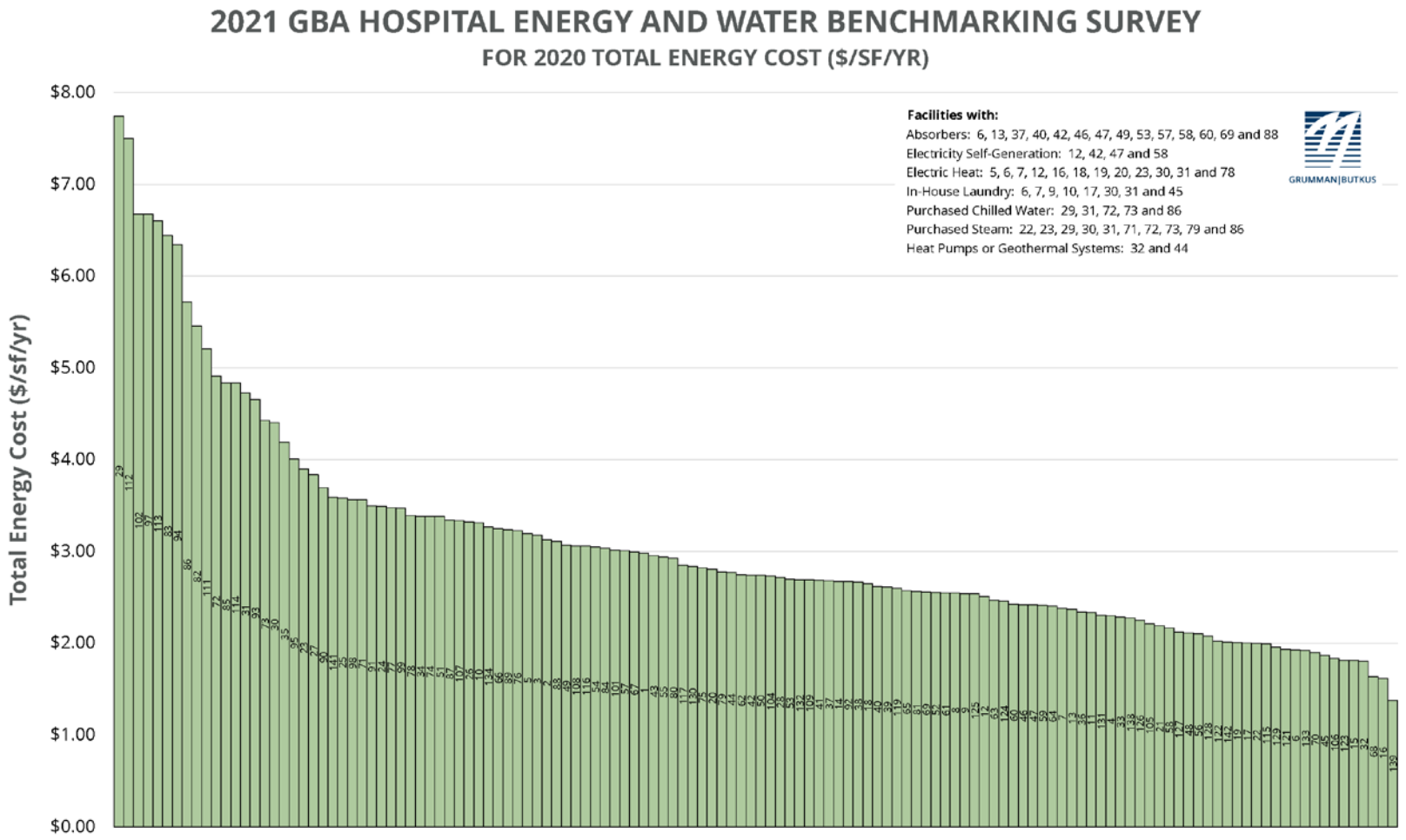
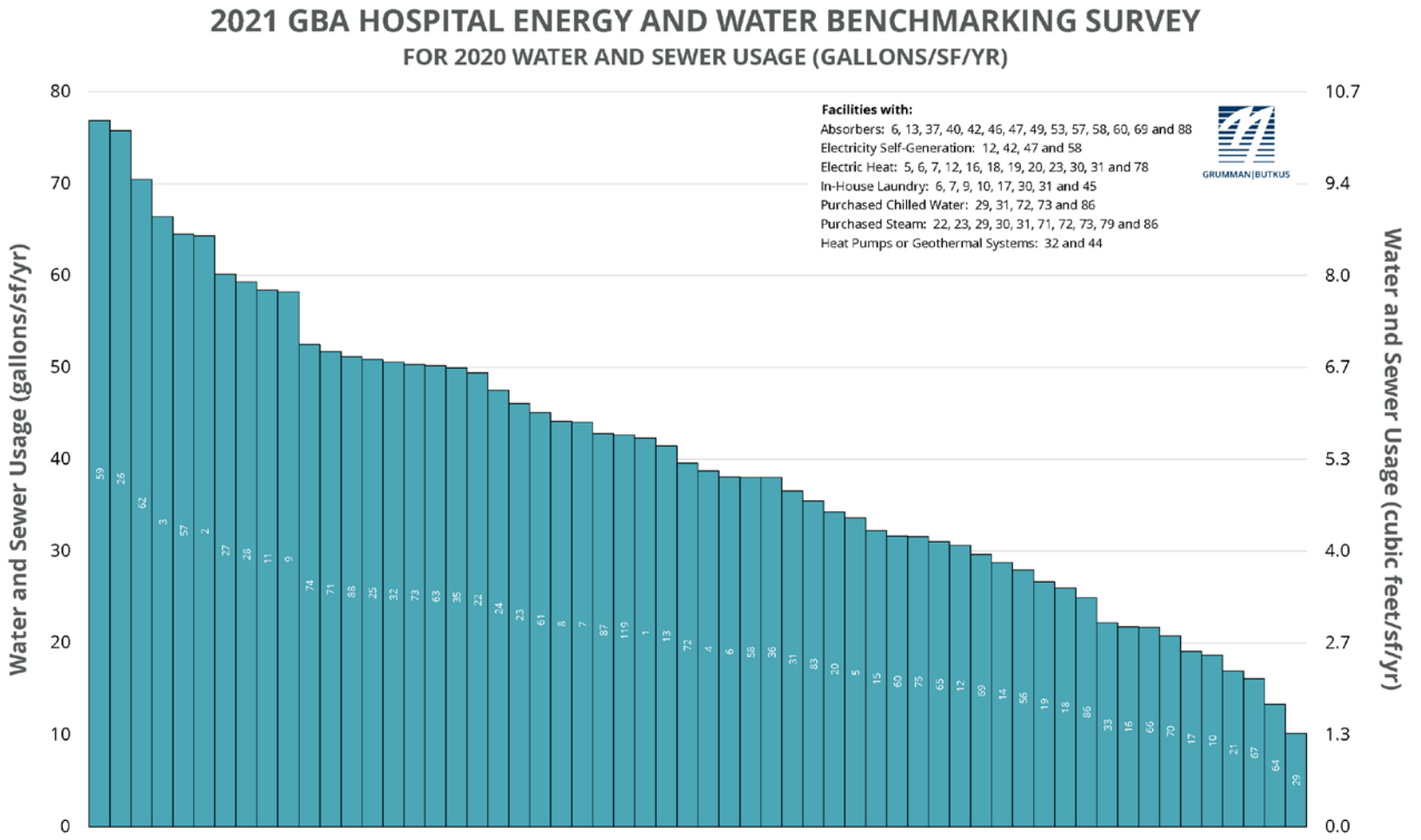
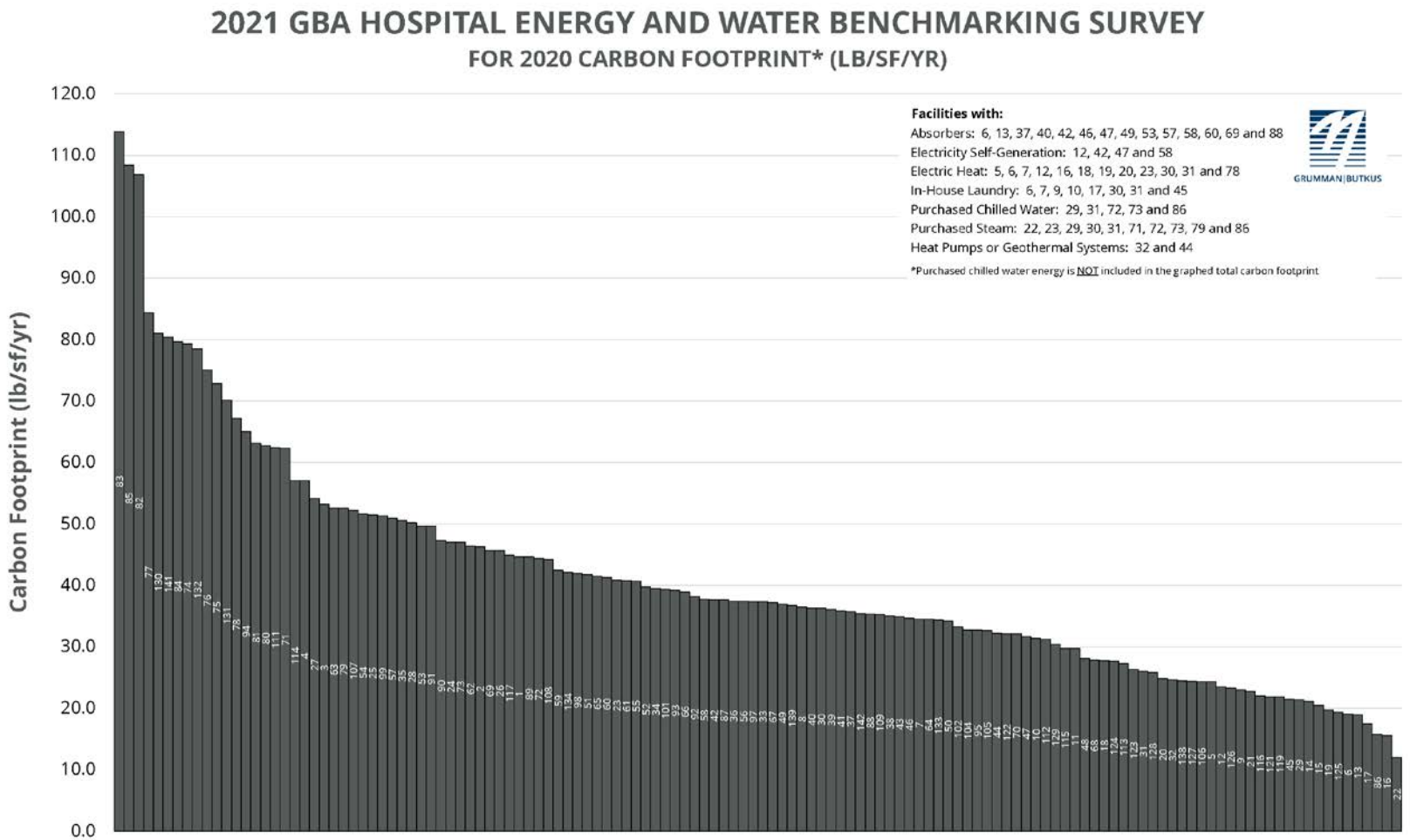


GBA Survey: Water Consumption (gal/sf/yr)



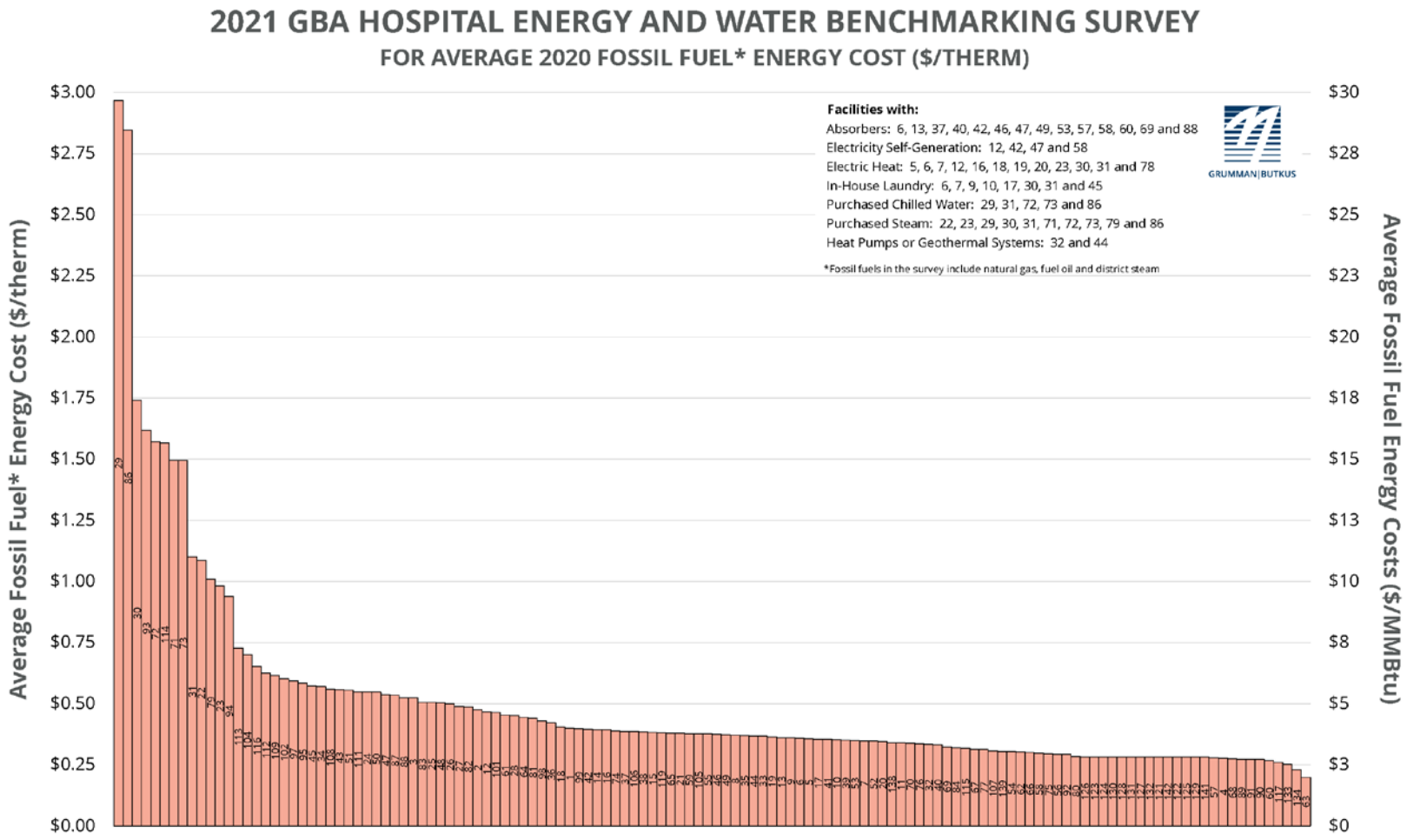
GBA Survey: Carbon Emissions (lbs CO_2/sf/yr)



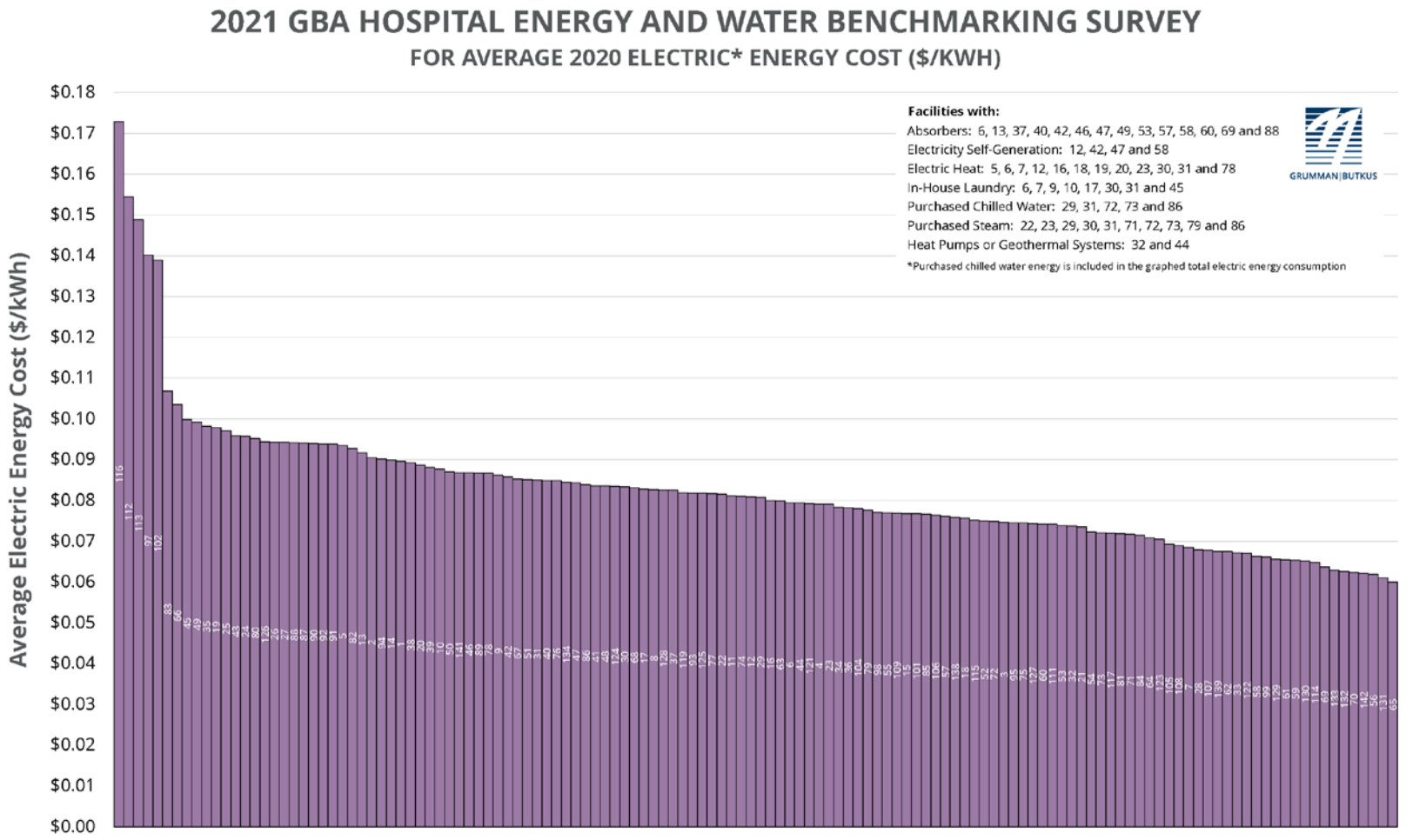
Optimize Energy Purchasing/Supply-Side Management

- Use RFP process to obtain apples-to-apples pricing
  - Gas and electricity are commodities
  - Suppliers will try to structure proposals to avoid ***direct*** comparisons based on commodity pricing
- Get pricing for both short and long term
  - Consider a combination of “locked-in” or fixed pricing along with some portion of index-based pricing
- **Use GBA’s benchmark data to assess how well you’re doing**

GBA Survey: Unit Cost Gas ($/therm)



GBA Survey: Unit Cost Electricity ($/kWh)



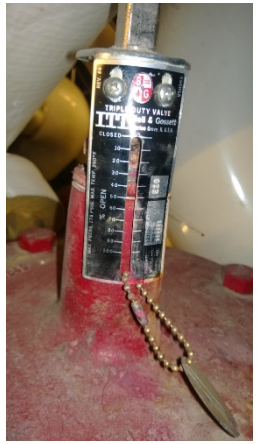
Look for Operations and Maintenance Savings

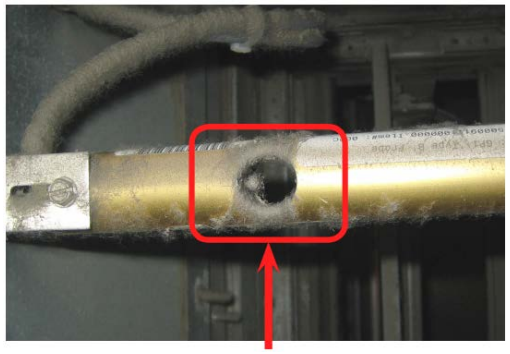
- Adjustments to procedural practices to reduce energy and water consumption
- Usually entails **no-cost** or **low-cost** measures
  - Dirty heat transfer surfaces: CHW/reheat coils
  - Demand response / load shedding
  - Steam traps
  - Water treatment
  - **Training, training and more training**

Retro-Commissioning (RCx)

Measure types

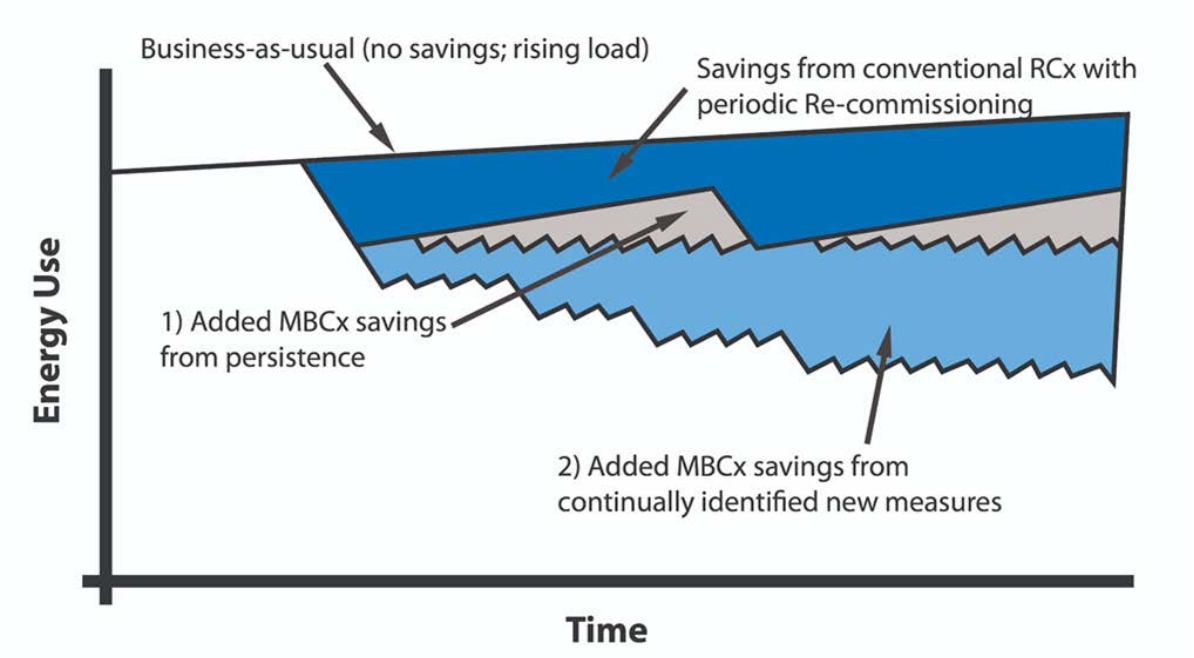
- Controls changes
  - Temperature resets
  - Static pressure resets
  - Economizer optimizations
  - Resolve simultaneous heating and cooling
- Repair/replace
  - Sensors
  - Valves
  - Dampers
  - Actuators
- Average savings = 3% to 5% total electricity and 3% total natural gas
- Average cost = $60k-$75k for measure implementation
- Consider MBCx for ensuring persistent savings and identifying further opportunities





Data Analytics: Why Do It Consistently?

- Often called MBCx (monitoring-based commissioning) or FDD (fault detection and diagnostics)
- Savings persist
- More insight over time
- More focused effort



Automated Data Analytics

Cutting-edge programming and automation increase efficiency

G/BA Engineering Experience

Over 40 years of engineering and Cx experience lead to sound engineering decisions

Faster Savings, Fewer Headaches

We have been able to identify and implement energy savings faster, boosting operating efficiency and reducing headaches for the operations and maintenance staff

Retrofit of Existing Building Systems/Equipment

- It's likely that 70% to 80% of the hospital buildings that will exist in 20 years **already exist**
  - Bringing the older, less efficient buildings up to par should be a key aspect of the program
- Many electrical and gas utilities have programs that help fund energy studies as well as the implementation of any efficiency measures
- Your benchmarking data may suggest that there are good opportunities for efficiency improvements

Retrofit Energy Opportunities

- Where do you typically find savings?
  - Lighting
  - Central heating/cooling plants
  - HVAC
  - Plumbing & process equipment
  - Demand response
- How much can typically be saved?
  - Facilities that implement all measures with an aggregate payback of seven years: 20% to 30% savings
  - Implement the comprehensive plan: 30% to 50%

Lighting Energy Conservation Measures (ECMs)

- Convert incandescent/fluorescent/mercury vapor/high-pressure sodium to LEDs
  - Exit signs
  - Surgical lights
  - Outdoor/parking structures
  - General office/task lighting
  - Signage/elevators
- On/off two-position lighting control
  - Occupancy sensors
  - Stairwells
  - “Quiet Time” control in patient corridors
  - Photocells on outdoor lighting
- Dimming
  - For perimeter areas with a natural light source

Heating plants

- Repair damaged/missing insulation
- Steam trap repairs/replacements; eliminate leaks, condensate dumping
- Burner tuning or replacement
- Blowdown heat recovery
- Stack economizer
- Deaerator vent heat recovery
- Condensing hot water boilers for heating
- Reverse osmosis for boiler make-up
- Reduce steam pressure
- Hot water temperature resets based on outside air temperature
- Meter boiler make-up/blowdown, deduct from sewer bill

Cooling plants

- Use year-round process cooling loops for process loads
- Auto reset of chilled water/condenser water temps (CHW/CW)
- Reset ΔP of chilled water system
- Convert all systems to variable flow: pumps, cooling towers, chillers
- Maximize ΔT
- Use cooling coil condensate for cooling tower make-up
- Investigate water treatment
- Install high-efficiency process cooling loop; eliminate all once-through water use for cooling
- Replace/consolidate small unitary cooling devices
- Check balancing valves on pumps; install VFDs
- Replace absorption chillers with electric (unless using waste heat)

HVAC

- Turn things off!
- Occupancy settings for VAV boxes
- Check BAS for “overridden” points
- Reset mixed air temperature / discharge air temperature (MAT/DAT) to reduce reheat
- Reset ΔP on variable air volume systems
- Convert constant volume systems to VAV
- Use fan coil units, chilled beams for areas with high cooling loads
- Air-to-air heat recovery
- OR ACH setbacks during unoccupancy
- Demand-controlled ventilation
- General office spaces (CO2)
- Kitchen (Melink)
- Lab (Aircuity)
- Convert 100% outside air AHUs to recirculating
- Install low-pressure-drop air filters
- Investigate and correct building pressurization issues

Plumbing/Process Equipment

- Variable frequency drives on domestic cold water booster pumps
- Replace water-cooled compressors, vacuum pumps
- Use heat pump or waste heat for heating domestic hot water
- Elevator controls
- Occupancy sensors on vending machines, printers, PCs
- High-efficiency low-temperature freezers
- High-efficiency sterilizers/autoclaves

Retrofit of Existing Building Systems/Equipment

Energy Conservation Measure	Individual			Cumulative			
	Annual Savings	Capital Cost	Simple Payback (yrs)	Annual Savings	Capital Cost	Simple Payback (yrs)	Reduction in Total Energy Costs
Incandescent lighting retrofits	$1,650	$1,400	0.9	$1,650	$1,400	0.8	0.1%
Pump modifications	$2,200	$8,900	4.1	$3,850	$10,300	2.7	0.3%
Fluorescent lighting retrofits	$51,100	$223,600	4.4	$54,950	$233,900	4.3	4.7%
AHU variable frequency drives	$8,490	$40,400	4.8	$63,440	$274,300	4.3	5.4%
High efficiency motors	$11,400	$61,900	5.4	$74,840	$336,200	4.5	6.4%
Variable air volume conversion - pneumatic controls	$28,200	$161,000	5.7	$103,040	$497,200	4.8	8.8%
Conversion to DDC controls	$67,600	$403,000	6.0	$170,640	$900,200	5.3	14.6%
Oxygen trim control	$9,240	$56,400	6.1	$179,880	$956,600	5.3	15.4%
Air-to-air heat recovery	$29,100	$199,000	6.8	$208,980	$1,155,600	5.5	17.9%
Variable air volume conversion – DDC controls	$28,200	$264,000	9.4	$237,180	$1,419,600	6.0	17.9%

Embed Life Cycle Costing Into Purchasing Policies

There are big differences in energy/water consumption of various pieces of process equipment – examples:

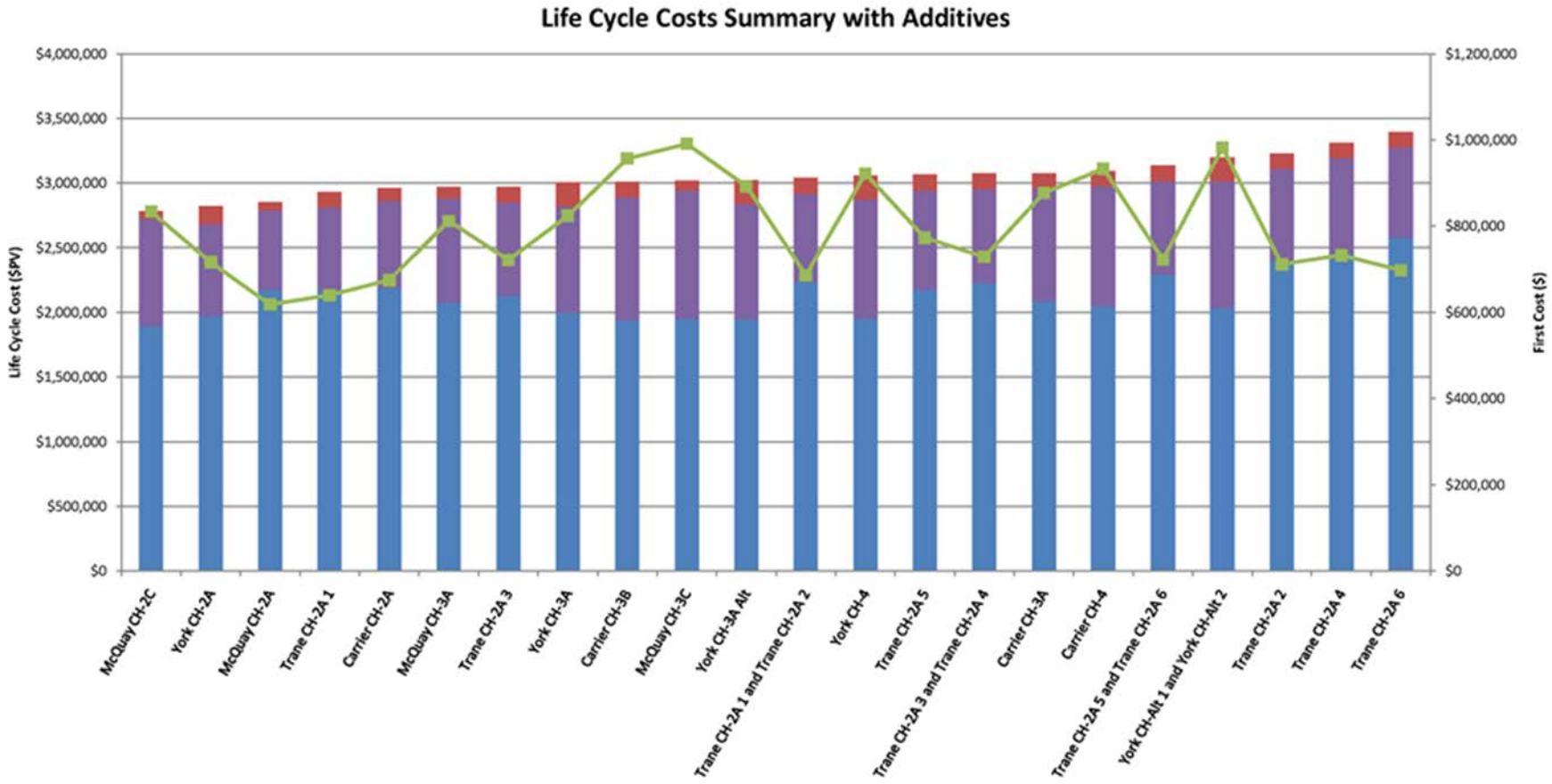
- Chillers
- Cooling towers
- Autoclaves/sterilizers
- Low-temperature freezers
- Ice makers
- Medical gases/air/vacuum

Employ a “total cost of ownership” evaluation for laboratory products or equipment

- Include energy, maintenance, end of life (or use) costs, waste disposal
- These may not be included in supply chain considerations

Example: Centrifugal Chiller Purchase

Pre-purchase major HVAC equipment based on lowest life cycle cost



Building Infrastructure Planning

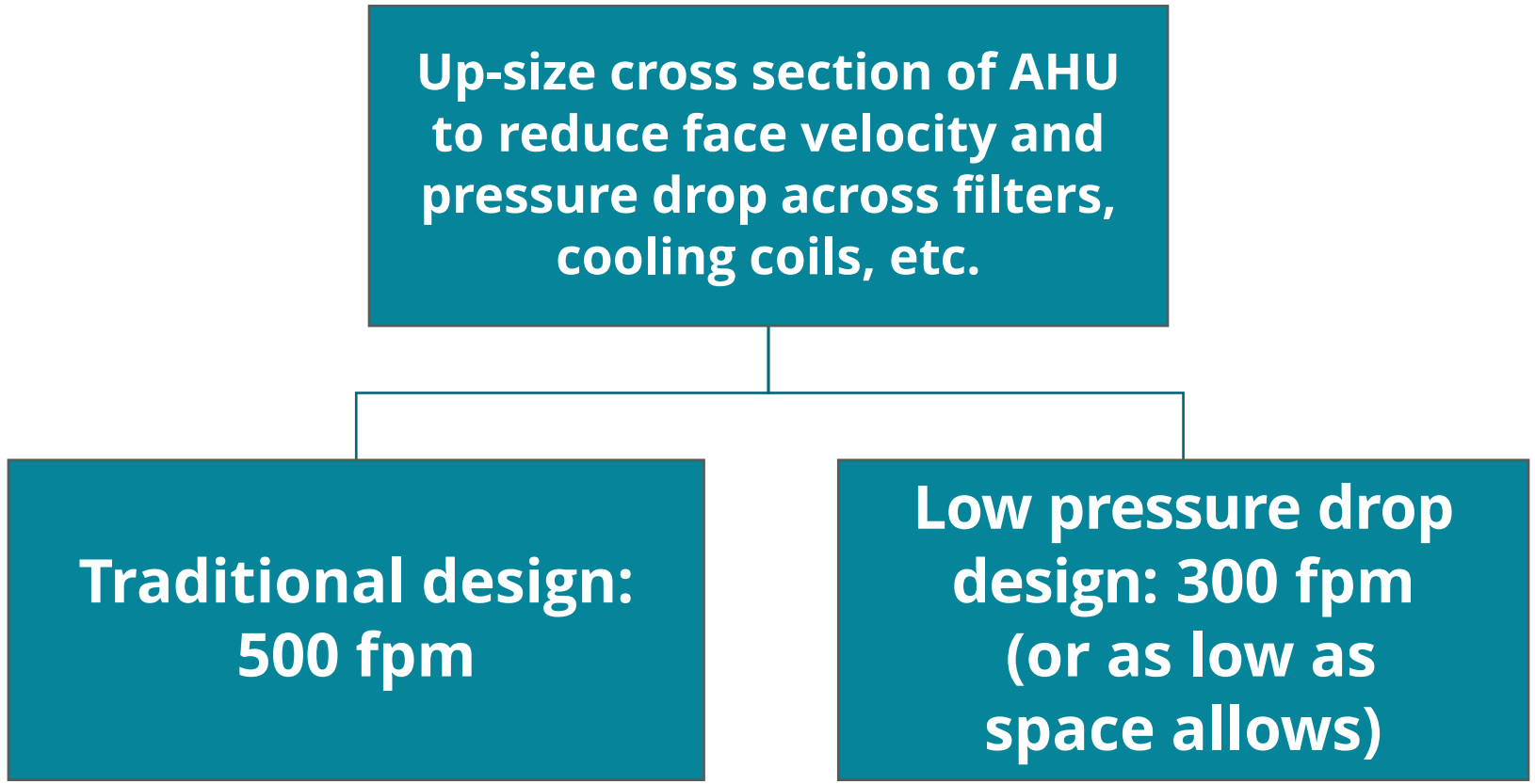
- Buildings are like complex machines – over time, parts break down or wear out and need to be replaced
- Whenever an energy-using system or piece of equipment is replaced or upgraded, this should be treated as an opportunity to exercise creative problem solving
  - Replace failing equipment, improve energy efficiency, and reduce operating costs
  - In some cases, the cost to operate a piece of equipment over its service life is several times the initial cost of the equipment
  - These are also opportunities to make “system” changes to achieve efficiency improvements

Building Infrastructure Planning

Estimates of Service Lives of Various System Components

Equipment Item	Median Years	Equipment Item	Median Years	Equipment Item	Median Years
Air conditioners		Air terminals		Air-cooled condensers	20
Window unit	10	Diffusers, grilles, and registers	27	Evaporative condensers	20
Residential single or split package	15	Induction and fan-coil units	20	Insulation	
Commercial through-the-wall	15	VAV and double-duct boxes	20	Molded	20
Water-cooled package	15	Air washers	17	Blanket	24
Heat pumps		Ductwork	30	Pumps	
Residential air-to-air	15 [b]	Dampers	20	Base-mounted	20
Commercial air-to-air	15	Fans		Pipe-mounted	10
Commercial water-to-air	19	Centrifugal	25	Sump and well	10
Roof-top air conditioners		Axial	20	Condensate	15
Single-zone	15	Propeller	15	Reciprocating engines	20
Multizone	15	Ventilating roof-mounted	20	Steam turbines	30
Boilers, hot water (steam)		Coils		Electric motors	18
Steel water-tube	24 (30)	DX, water, or steam	20	Motor starters	17
Steel fire-tube	25 (25)	Electric	15	Electric transformers	30
Cast iron	35 (30)	Heat exchangers		Controls	
Electric	15	Shell-and-tube	24	Pneumatic	20
Burners	21	Reciprocating compressors	20	Electric	16
Furnaces		Package chillers		Electronic	15
Gas- or oil-fired	18	Reciprocating	20	Valve actuators	
Unit heaters		Centrifugal	23	Hydraulic	15
Gas or electric	13	Absorption	23	Pneumatic	20
Hot water or steam	20	Cooling towers		Self-contained	10
Radiant heaters		Galvanized metal	20		
Electric	10	Wood	20		
Hot water or steam	25	Ceramic	34		

Example: Low Pressure Drop Design of AHU Replacement



Example: Low Pressure Drop Design of AHU Replacement

For a **10,000 cfm AHU**,
cross-sectional dimensions will increase from:

5-ft wide by 4-ft tall
20-ft^2 ; 500 fpm
to
6-ft wide by 5.5-ft tall
33 ft^2 ; 300 fpm

The net incremental cost is small:

- Bigger sheet metal box
- Coils, filters are larger
- Motors, VFDs are smaller
- Can often eliminate sound attenuators, mist eliminators

Result: Simple, reliable energy savings over the life of the AHU!

- **Can never be "overridden"**

Example: Low Pressure Drop Design of AHU Replacement

- Reducing pressure drop in AHU reduces the power required to drive the fan:
  - Fan at 10,000 cfm and **7 inch WG** static pressure = **13.5 kW/18.0 bhp**
  - Fan at 10,000 cfm and **4 inch WG** static pressure = **5.8 kW/7.8 bhp**

Incorporate Energy Efficiency Into the Design Process for Major New Buildings, Additions, and Renovations

- Create Design Standards covering:
  - Building envelope
  - Lighting/electrical systems
  - HVAC
  - Plumbing
  - Temperature controls/EMS
- Include Enhanced commissioning
- Consider deploying a monitoring-based commissioning platform . . . also known as automated fault detection and diagnostics (FDD) or analytics

Major New Buildings, Additions, Renovations

Set goals for new construction, such as:

- Renovations:
  Must be 20% below IECC
- New construction:
  Must be 30% below IECC
- LEED Gold Certification

Take Advantage of All Grant And Rebate Opportunities

ComEd and Peoples/NiCor have rebate and incentive programs that can help fund your program:

- Energy audits
- Retro-commissioning (RCx), MBCx
- Prescriptive efficiency measures (e.g., lighting, variable frequency drives, high-efficiency air conditioning equipment)
- Custom efficiency measures: Usually “system” changes (e.g., convert air or water systems to variable flow)
- Green features in new construction
- Combined heat+power (CHP) systems
- Renewables (wind, solar, geothermal)

Leverage Recognition Opportunities To Build C-Suite Support

- ASHE/American Hospital Association Energy to Care program
- USGBC: LEED for new and existing buildings
- ASHRAE Awards
- EPA's ENERGY STAR label for facilities
- Practice Greenhealth's Environmental Excellence Awards
- I²SL's Sustainable Laboratories Awards Program

ENERGY to care

Greater efficiency supports patient care.

U.S. GREEN BUILDING COUNCIL
LEED GOLD
USGBC

ASHRAE

2021
Practice Greenhealth
ENVIRONMENTAL EXCELLENCE
AWARDS

Consider Alternative Financing Options

- Traditional path: Fund with operating income or capital budgeting process (do-it-yourself)
- 3rd party financing with ESCO
- Energy Services Agreement (ESA)
- PACE financing
- Power Purchase Agreements (PPAs)
- Green revolving fund utilizing capital from hospital's endowment fund

Thank You & Questions

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GRUMMAN|BUTKUS
ENERGY EFFICIENCY CONSULTANTS
AND SUSTAINABLE DESIGN ENGINEERS

HEALTHCARE ENGINEERS SOCIETY OF NORTHERN ILLINOIS
HESNI

Peoples Gas
Energy Efficiency Program Overview

Who Qualifies?

- All Peoples Gas and North Shore Gas Customers
- Public Sector Hospitals
- Private Sector Hospitals
- Usage above 400K therms = Commercial-Industrial Program*
- Usage below 400K therms = Small and Medium size Business Program*
    - Medical Office buildings
    - Outpatient Facilities
    - Surgery Centers

*Incentives can differ between programs

Prescriptive and Custom Incentives

- General Guideline: If it saves gas, we likely have incentives available to you
  - Prescriptive Menu (Steam Traps often covered at 100% if in-house labor is used to install)
  - Private Sector Custom Rebates: $1/therm saved in first year
  - Public Sector Custom Rebates: $2.50/therm saved in first year
  - Payback Window on Custom Projects: 1-7 years

Prescriptive Rebates - what are they?

Prescriptive Rebates

- Menu of 1-for-1 upgrades with predetermined per unit, or per capacity unit, rebates
- Must replace existing equipment and meet specified requirements
- Pre-approval required for rebates
  ≥ $10,000, more than 250ft of pipe insulation, and all steam trap projects
- Rebate may not exceed 100% of total project cost (excluding internal labor)

Typical Healthcare Projects

- Steam Trap Survey and Replacements
- Pipe Insulation and Removeable Insulated Jackets
- Steam and Hot Water Boiler Replacements
- Boiler Tune-ups
- Kitchen Demand Control Ventilation
- Gas Optimization Studies
- Boiler Controls
- Burner upgrades
- Boiler Upgrades
- Building Automation System Upgrades

Example Success

- Large City of Chicago Hospital replaced their original burners with 3 new state-of-the-art burners with O2 trim, capable of running at 3% O2 across the firing range.
- This achieved a 4% reduction in natural gas use, estimated annual savings of 151,612 therms, and operational savings of over $83,000 on just natural gas per year. Add in chemicals and makeup water and the savings are much higher.

Peoples/North Shore Gas Custom Project

Color Code ==> Enter Data | Auto Calculate

Project #:		Program Year :	2022
Program Name :	C&I Custom	Incentive Expiration Date:	12/31/2022
Energy Advisor :		Utility :	PG
Energy Engineer :			
Site/Payment Contact :			
Site Location :	Big Hospital downtown Chicago		Illinois
Trade Ally Information:			
Measure :			
Brief Project Description:	The project is to replace the burners of (3) 600-HP Superior HPS Boilers (Model #4-5-3004L-IC) with High-Efficiency, High-turndown burners with hot-air intake and stack shut-off closures. The new burner will have linkageless and O2 trim controls. The new burner includes stack shut-off closures that are automated and will be positioned on the combustion air intake; thus, per the IL TRM, a 1% increase in efficiency was used. The existing boilers have variable speed drives. Also, two of the existing boilers have economizers; thus, a modified economizer efficiency based on weighted load was estimated. Two combustion readings were provided, and based on the usage history data, the existing efficiency was estimated at 79.9%. The proposed efficiency was estimated at 83.6% **Update 2019: New combustion readings were provided by contractor.**		
Account Number:	60742027600008		

Page 1

Project Information:

			Base System Use	Project Savings - Gross	Project Savings - Net	% Reduction
Project Cost :	$ 503,836.00	therm	3,309,697.2	151,612.04	#N/A	4.6%
Gas Price :	$0.49	kWh :	n/a	n/a	n/a	n/a
		kW:	n/a	n/a	n/a	n/a
Base Energy Cost :	$ 1,615,866.89					
Annual Cost Savings :	$ 83,386.62	NTGR% :	#N/A			
		$/Net Therm :	#N/A			
Final Rebate Amount :	$151,612.04				w/o Incentive	w/ Incentive
% of Project Cost :	30.1%	TRC	0.00	Project Payback :	6.04	4.22

No Cap Rebate	$151,612.04
Bonus Rebate	$0.00
Capped Rebate	$151,612.04

Please email me for current Program Applications and to discuss quick site visit to uncover some quick wins!

Jim Hauser
Senior Energy Advisor
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815-614-0555 (Cell)