

Reducing Energy Costs in Maryland's Hospitals

October 10, 2013



AGENDA

8:30 a.m. **Welcome and Introductions**

- Meghan Allen, VP Operations, Maryland Hospital Association
- Charlotte Wallace, Chair, Maryland Healthcare Sustainability Leadership Council
- Daniel Martin, Director, AtSite Inc
- Joan Plisko, Technical Director, Maryland H2E

8:45 **Results from MD H2E Hospital Environmental Sustainability Practices and Energy Benchmarking Surveys**

Joan Plisko, PhD, Technical Director, MD H2E and Daniel Martin, Director, AtSite Inc

9:30 **Correlating Energy Projects to Environmental and Health Benefits**

Laura Anderko, PhD, RN, Robert and Kathleen Scanlon Endowed Chair in Values Based Health Care, Fellow, Center for Social Justice, School of Nursing and Health Studies, Georgetown University

10:15 Break

10:30 **Incorporating “High Tech” Tools & Processes with “High Touch” Employee and Staff Engagement**

Rich Morgan, Senior Director Facilities and Real Estate, AtSite Inc

11:15 **Panel Discussion: Financing Hospital Energy Projects**

- Terry Daly, Finance Project Manager, Maryland Clean Energy Center
- Daniel Bresette, Program Manager, Maryland Energy Administration
- Daniel Martin, Director, AtSite Inc

Moderated by: Pete Desjardins, V.P. Business Development, AtSite Inc

Noon **Lunch/Featured Speaker: GBMC Energy Management Journey**

Mike Forthman, Vice President Facilities and Support Services, GBMC

1:00 **Additional Networking**



MD H2E's Vision

To advance a culture of environmental health and sustainability in Maryland's health care community



It Takes a Village

- **Basement**

- Environmental services
- Facilities management
- All front line workers...

- **Bedside**

- Nurses, nurses, nurses
- Physicians, clinicians
- Dietitians, therapists and more...

- **Management**

- EVS, capital improvement
- Purchasing, food services
- Nursing, pharmacy and more...



- **Boardroom**

- Executives
- Leadership
- Board Members

- **Community**

- Neighbors
- Supply Side
- Local government
- NGOs
- Visitors



MD H2E's Mission

Through networking, education, and technical assistance MD H2E supports hospitals in becoming environmental health and sustainability leaders

Moving hospitals forward in the right direction!



- Audits
- Awards
- Case Studies/Pilot Projects
- Educational Material
- Listserv
- Meetings/Conferences

- Newsletters
- Partnerships and Collaborations
- Site Visits
- Vendor and Peer Connections/Networking
- Website

MD H2E's Values

Health • Stewardship • Leadership • Integrity • Prevention
Excellence • Community • Collaboration • Innovation



A Race to Recycle: The Recycling Process at Sinai Hospital



Make your home safe for baby

PROTECT YOUR BABY FROM HARMFUL PESTICIDES



Environmentally Sustainable Initiatives at Maryland's Hospitals: Survey Results, Summer 2013



PRESENTED DURING:

REDUCING ENERGY COSTS IN MARYLAND'S HOSPITALS

OCTOBER 10, 2013

JOAN PLISKO, PHD, TECHNICAL DIRECTOR, MD H2E
JPLISKO@SOM.UMARYLAND.EDU

Methods

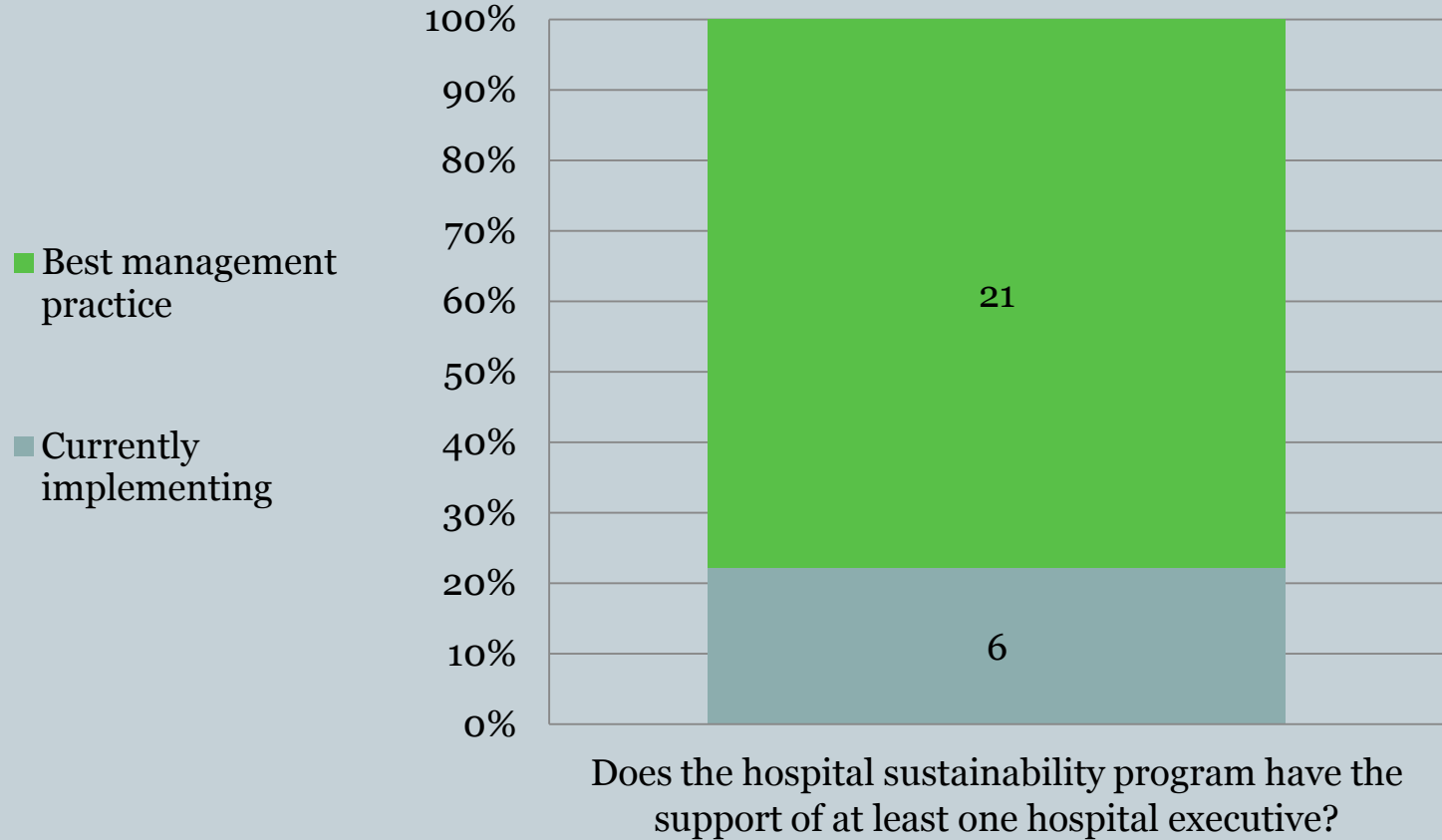


In spring 2013, Maryland Hospitals for a Healthy Environment (MD H2E), in collaboration with the Maryland Health Care Sustainability Leadership Council (MD HCSLC) sent the survey via Survey Monkey to 60 hospitals in Maryland. **Thirty-six hospitals** replied, including:

- 27 community hospitals
- 3 specialty hospitals
- 3 state hospitals
- 2 academic/research hospitals, and
- 1 federal hospital

LEADERSHIP:

75% of hospitals DO have the support of at least one executive

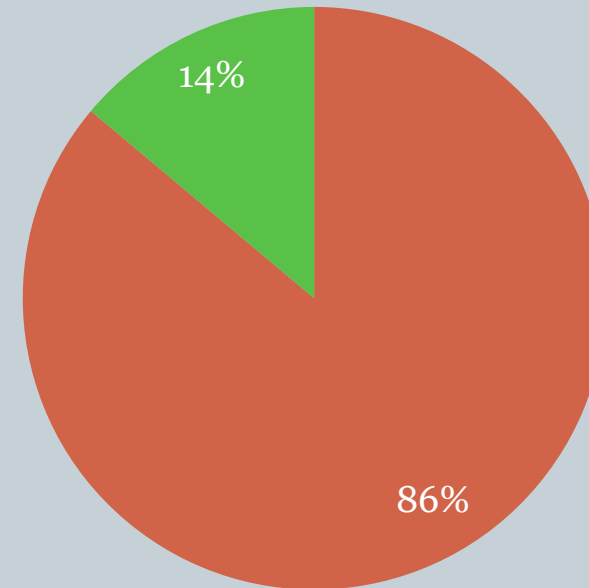


Additionally, 75% of hospitals are, at the very least, in the planning stages in having a **sustainability mission statement**, and a **sustainability plan/ policy in place**.

However, 86% of hospitals surveyed DO NOT employ a sustainability manager



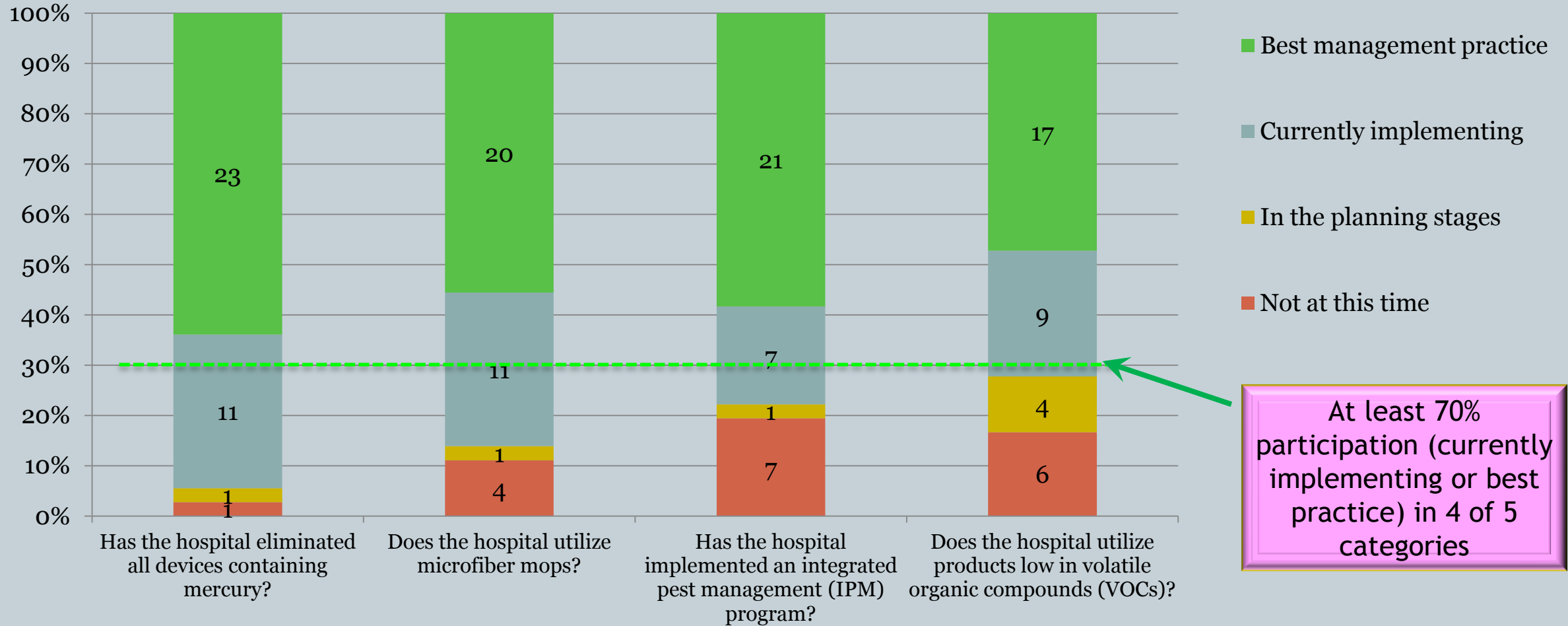
Does the hospital employ a sustainability manager?



- Not at this time
- In the planning stages
- Currently implementing
- Best management practice
- Would like more information

Funding a position dedicated to sustainability is an all or nothing proposition: Only 5 hospitals surveyed employ a sustainability manager, and none of the remaining have plans to.

TOXICS and CHEMICAL REDUCTIONS: Hospitals show high rates of participation



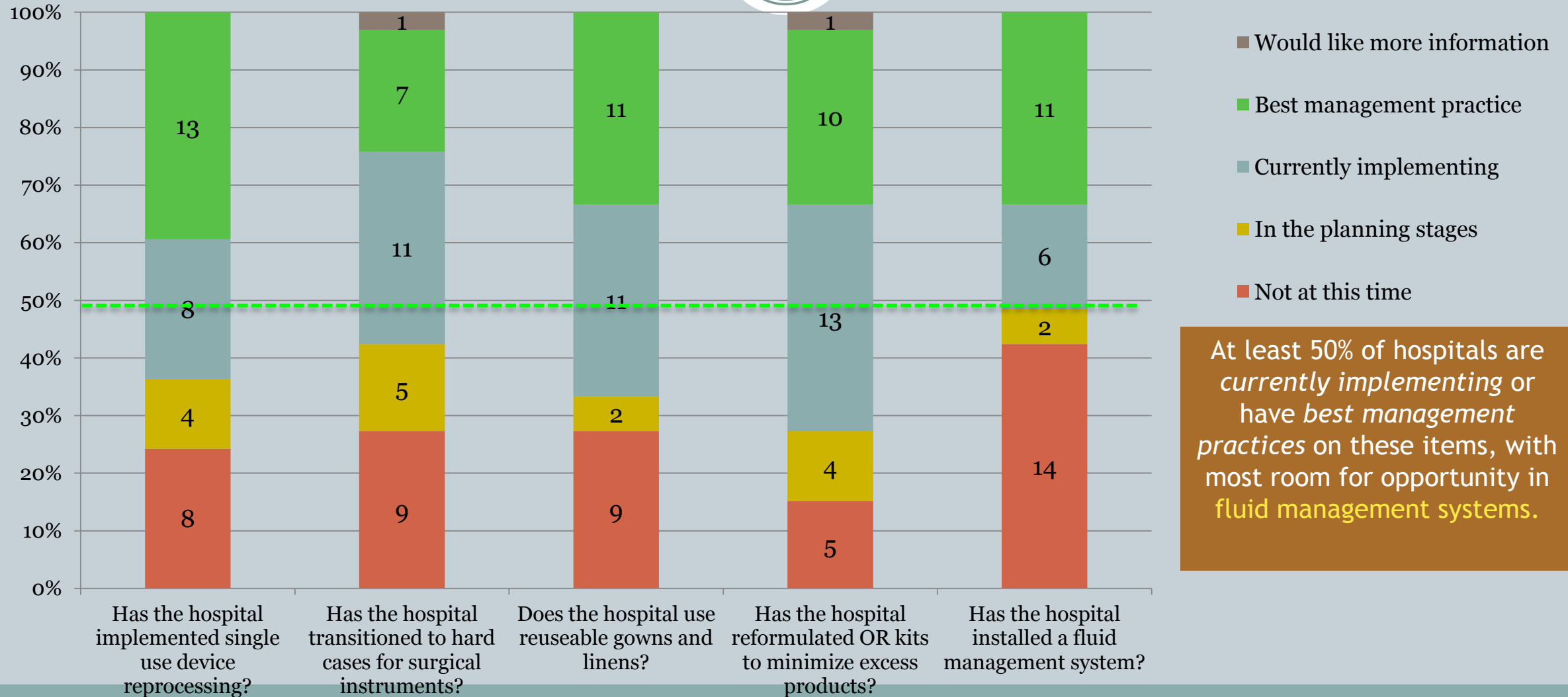
WASTE MANAGEMENT AND RECYCLING: Hospitals are high achievers!

Hospitals are “participating” by taking part as a *best management practice* or *currently implementing*.

- **94%** of hospitals track the disposal of solid waste, regulated medical waste, recycling, and hazardous waste
- **88%** of hospitals have a regulated medical waste reduction program
- **97%** of hospitals segregate hazardous pharmaceutical waste
- **88%** Recycle Bottles and cans
 - **71%** ... Batteries
 - **80%** ... Electronic waste
 - **91%** ... Cardboard
 - **68%** ... Construction materials
 - **85%** ... Non-confidential paper
 - **80%** ... Equipment donation
 - **50%** ... Food waste
 - **65%** ... Medical plastics
 - **34%** ... Blue wrap

Areas of opportunity!

OPERATING ROOM: Programs are fairly evenly split

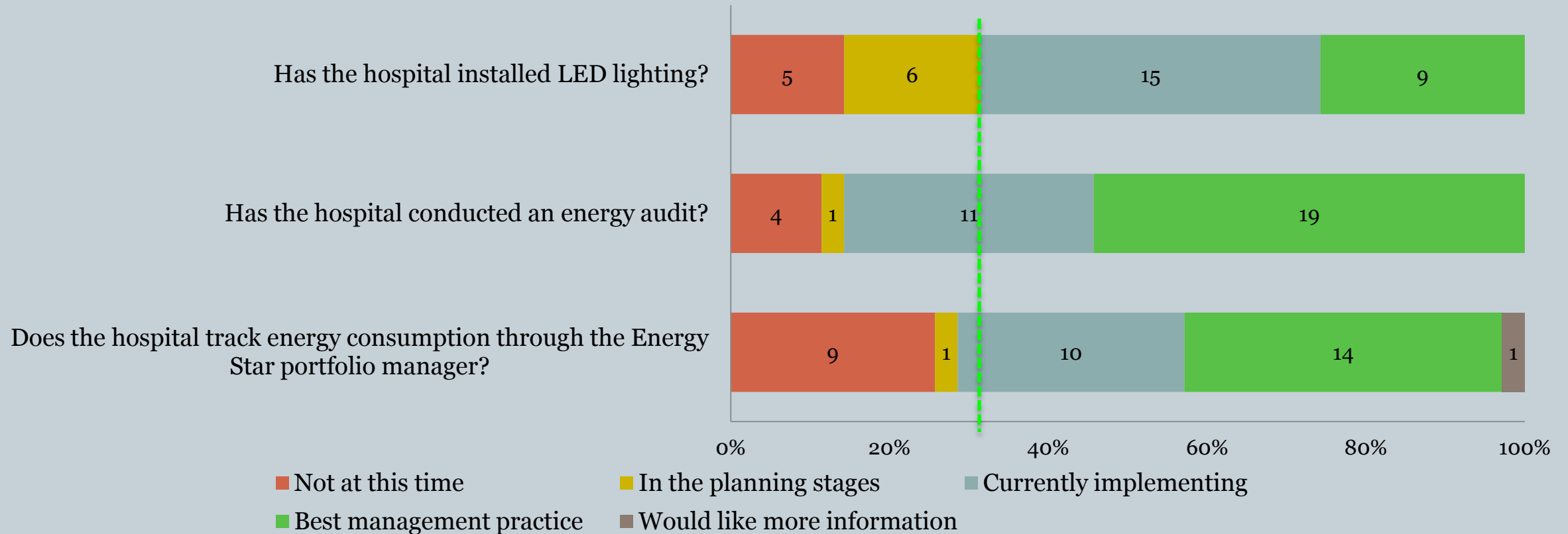


At least 50% of hospitals are *currently implementing* or *have best management practices* on these items, with most room for opportunity in *fluid management systems*.

ENERGY CONSERVATION: Highlights



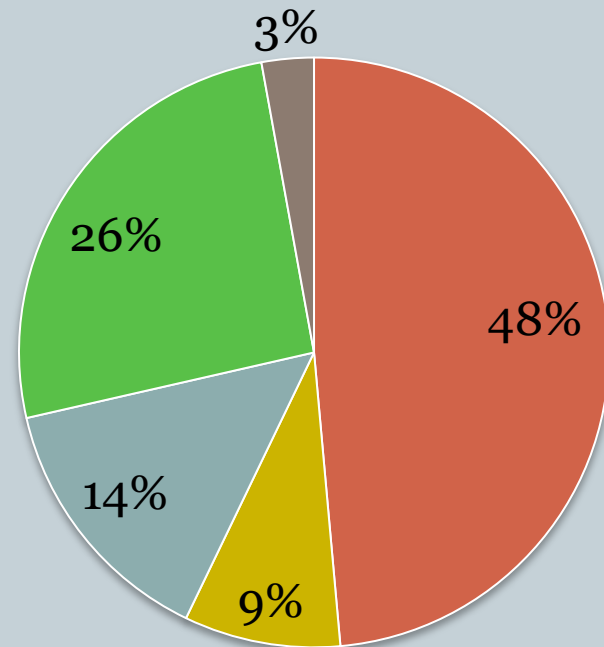
More than 2/3 of hospitals have installed LED Lighting, conducted an energy audit, and/or utilize the Energy Star portfolio manager.



ENERGY CONSERVATION: Making Progress



Has the hospital implemented staff driven energy savings education initiatives?



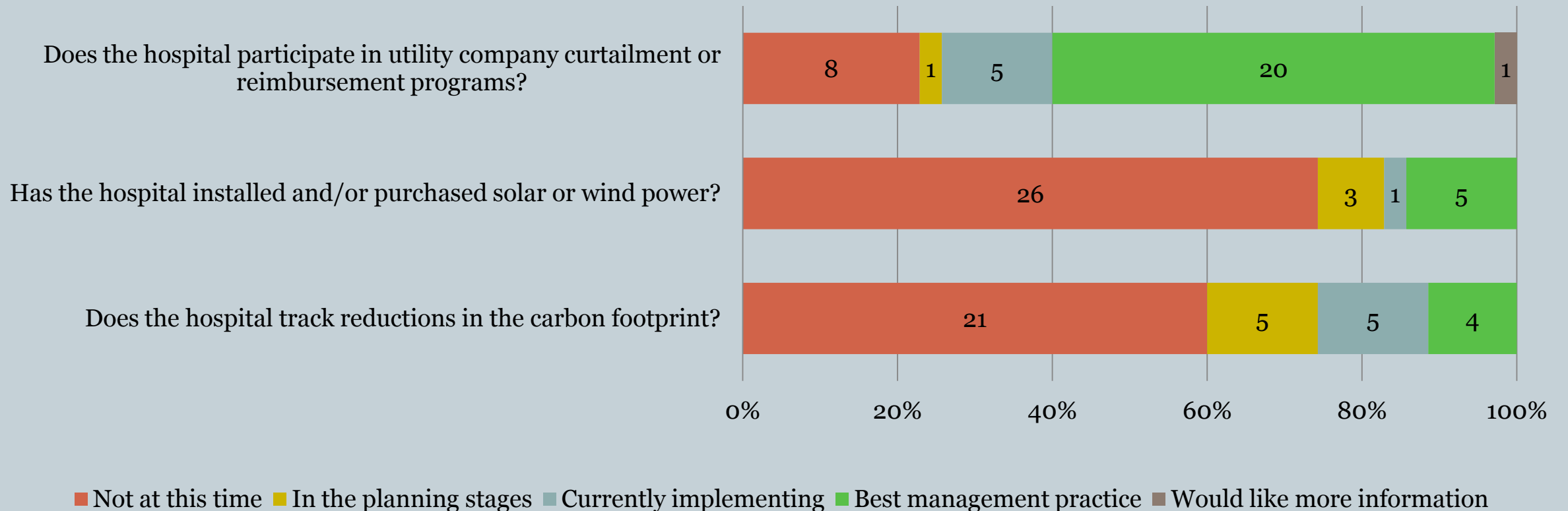
- Not at this time
- In the planning stages
- Currently implementing
- Best management practice
- Would like more information

Almost 50% have not yet begun implementing energy savings education

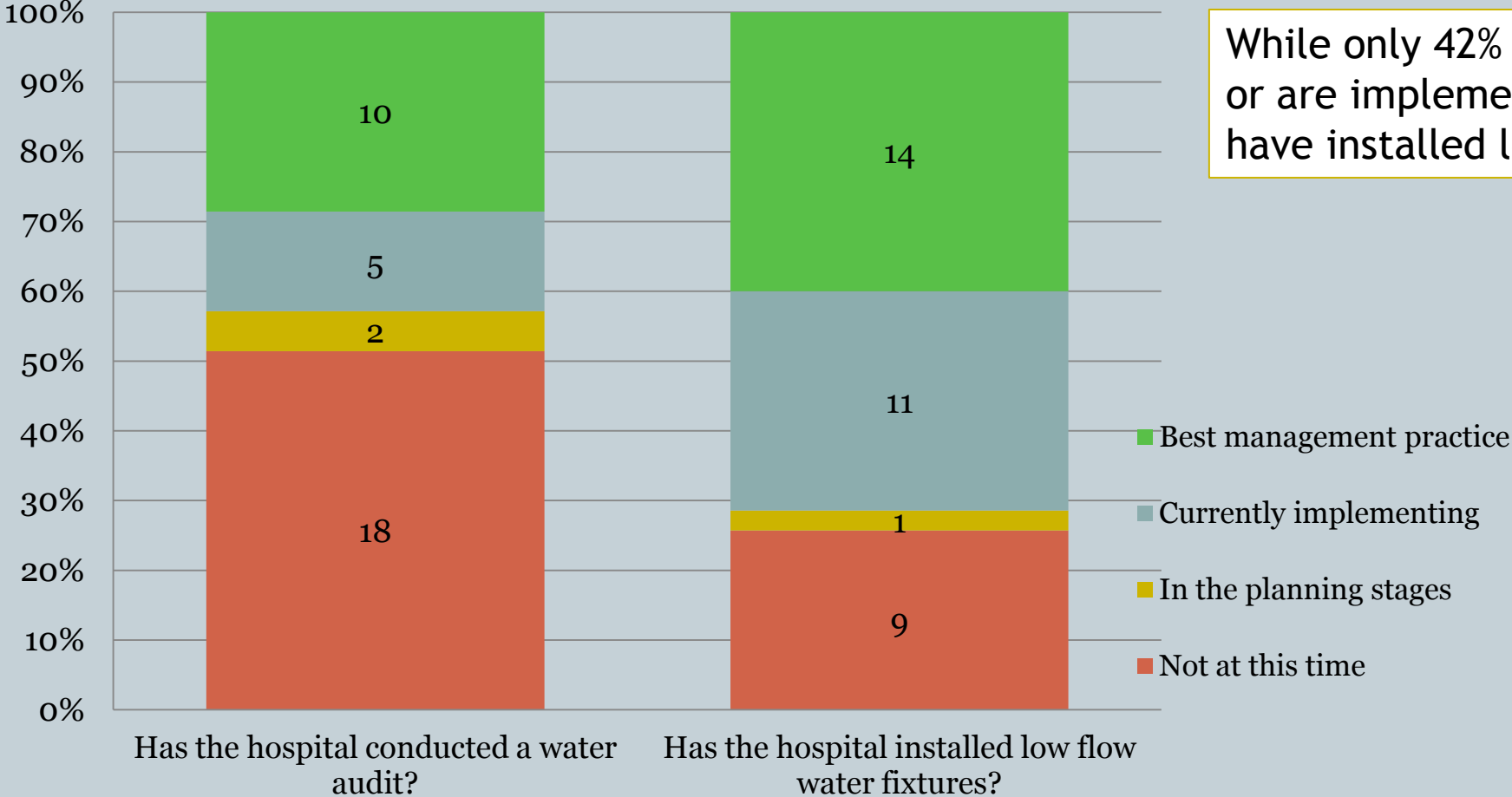
UTILITY MANAGEMENT



Most hospitals are participating in utility company curtailment or reimbursement programs, however tracking reductions in the carbon footprint and utilizing alternative energy are both areas of opportunity.



WATER CONSERVATION



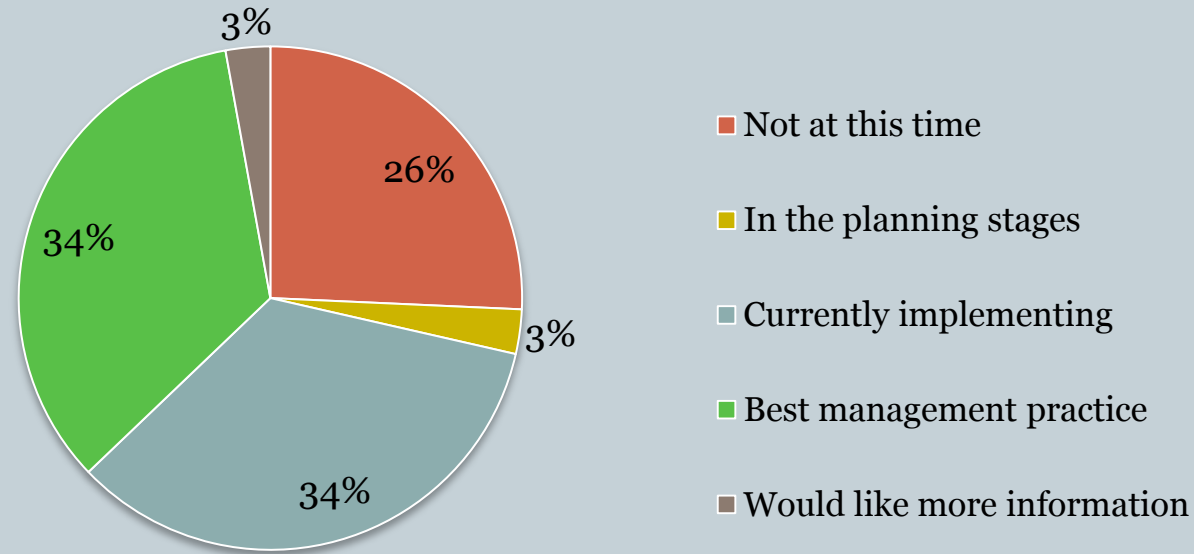
While only 42% of hospitals have completed or are implementing water audits, 71% have installed low flow water fixtures

- Best management practice
- Currently implementing
- In the planning stages
- Not at this time

FOOD SERVICES: Sustainable food programs are growing!



Has the hospital increased purchase of foods produced by local farmers (250 mile radius)?



More than 2/3 of hospitals are participating in **purchase of foods from local farmers.**

Summary



- This survey will establish a benchmark from which to compare future progress
- 2014 survey to be deployed in Spring
- Complete (blind) survey results/ raw data can be found on the MD H2E website <http://mdh2e.org/wp-content/uploads/2013/09/Best-Practices-Survey-Raw-Answers.pdf>
- Questions? Comments? Suggestions for next year? Contact Joan Plisko at jplisko@som.umaryland.edu

MD H2E Energy Benchmarking Survey Results, Fall 2013



PRESENTED DURING:

REDUCING ENERGY COSTS IN MARYLAND'S HOSPITALS

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JOAN PLISKO, PHD, TECHNICAL DIRECTOR, MD H2E
JPLISKO@SOM.UMARYLAND.EDU

DANIEL MARTIN, DIRECTOR, ATSITE INC
DMARTIN@ATSITEINC.COM

Methods



In fall 2013, Maryland Hospitals for a Healthy Environment (MD H2E), in collaboration with AtSite Inc, sent the survey via Survey Monkey to 60 hospitals in Maryland. **Seventeen** hospitals replied, including:

- 12 community hospitals
- 3 specialty hospitals
- 1 academic/research hospital, and
- 1 state hospital

What Do These Maryland Hospitals Look Like?



	2012	Range
• Average Size	572,070 ft ²	125,000 – 2.35M ft ²
• Average Number of Beds	257 beds	102 – 800 beds
• Average Square Feet per Bed	2,114 ft ² /bed	787 – 3,014 ft ² /bed
• Average Electricity Usage	21,037,094 kWh	3.3M – 90.8M kWh
• Average Electricity Cost	\$1,857,409	\$363K – \$8.2M
• Average Natural Gas Usage	747,025 therms	124K – 1.6M therms
• Average Natural Gas Cost	\$450,133	\$86K – \$875K

Year over Year Energy Use



Average Electricity Use Intensity Data	2011 Maryland Hospitals Surveyed	2012 Maryland Hospitals Surveyed
Kilowatt hours per Square Foot	36.1 kWh/ft ²	35.9 kWh/ft ²
Kilowatt hours per Licensed Bed per Day	205 kWh/bed/day	206 kWh/bed/day

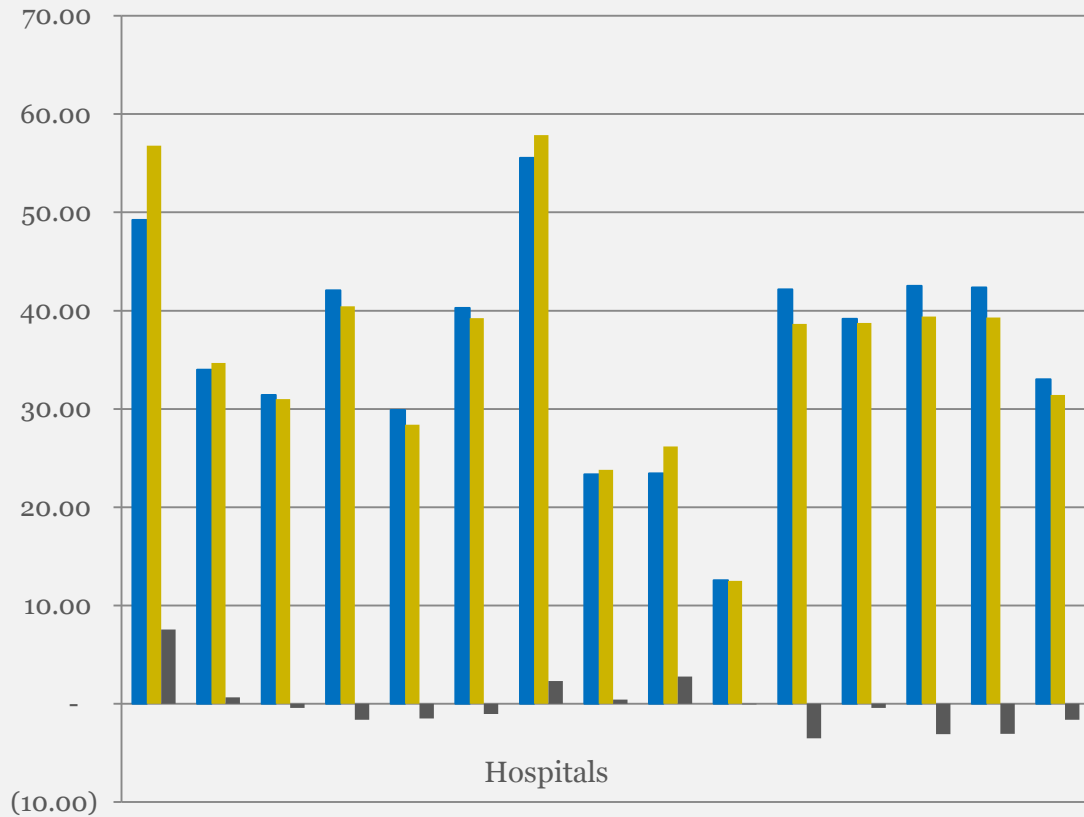
Average Natural Gas Use Intensity Data	2011 Maryland Hospitals Surveyed	2012 Maryland Hospitals Surveyed
Therms per Square Foot	1.54 therms/ft ²	1.47 therms/ft ²
Therms per Licensed Bed per Day	9.00 therms/bed/day	8.87 therms/bed/day

Year over Year Energy Use



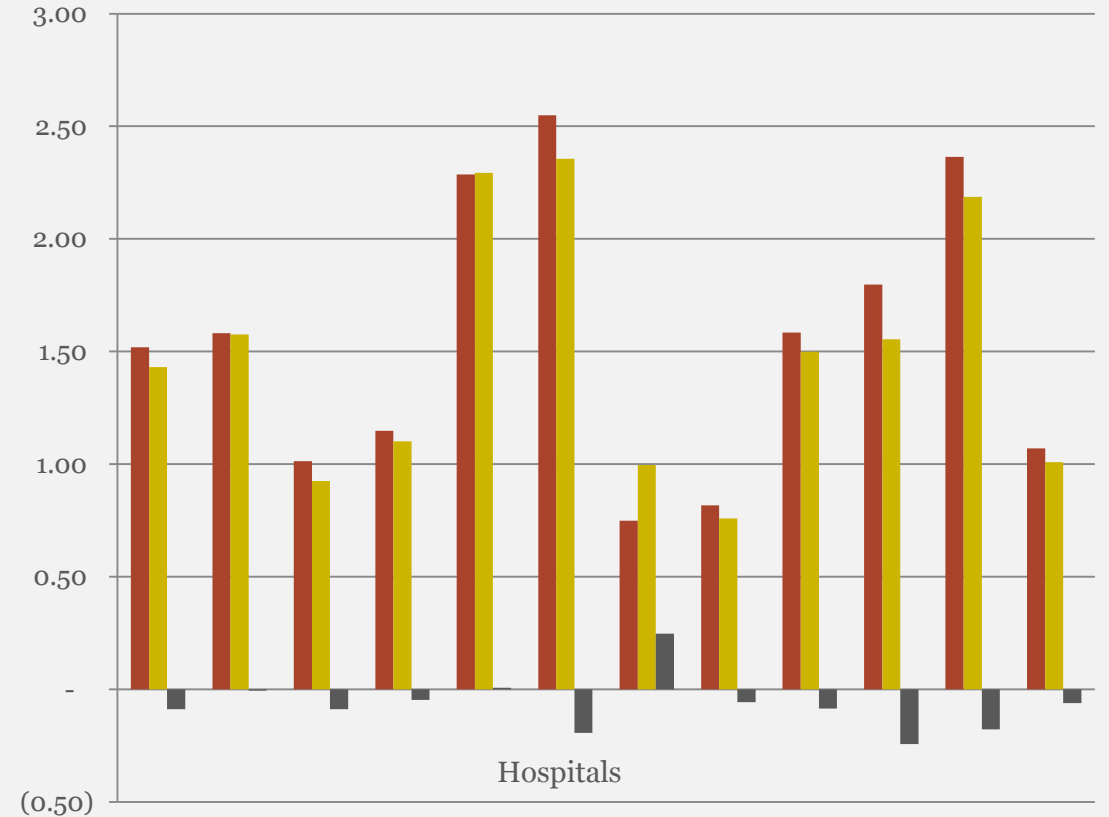
2011 & 2012 Electricity Use

■ 2011 Elec (kWh/sqft) ■ 2012 Elec (kWh/sqft) ■ Change



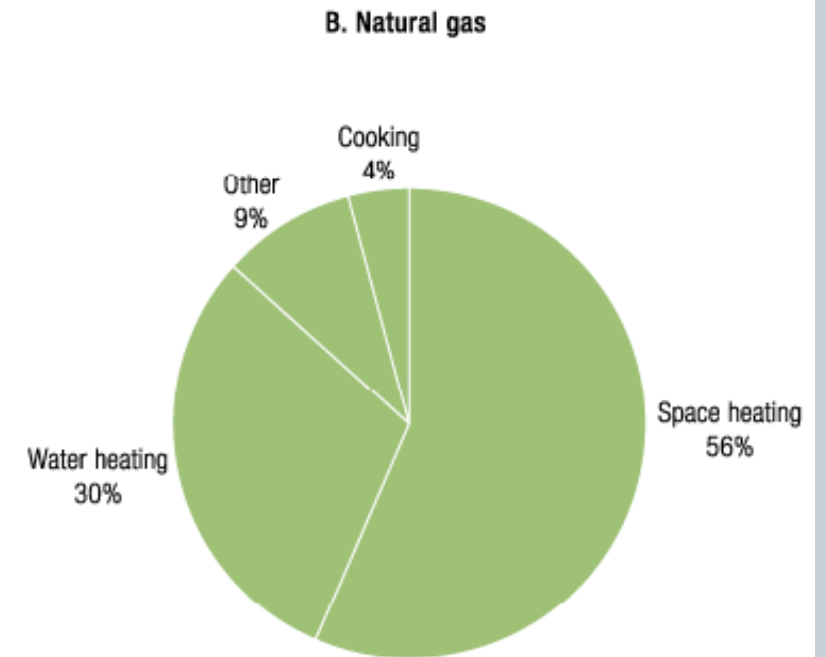
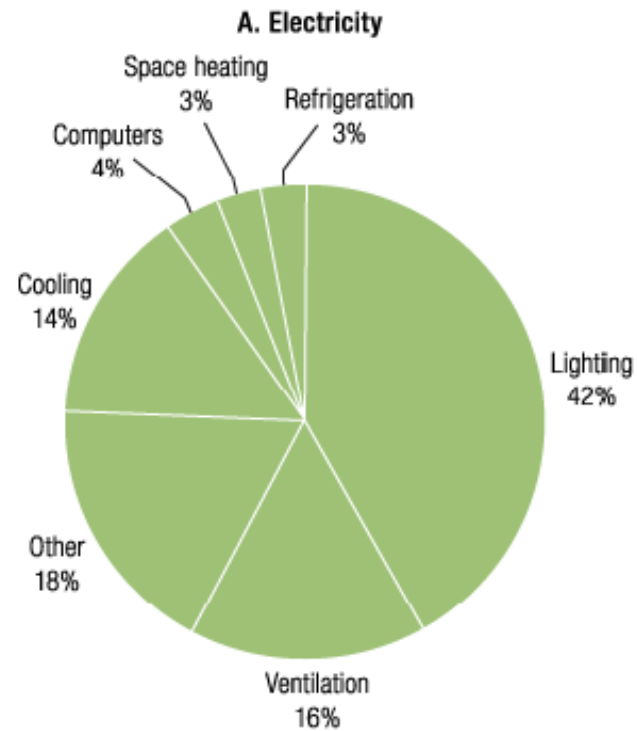
2011 & 2012 Natural Gas Use

■ 2011 Gas (therms/sqft) ■ 2012 Gas (therms/sqft) ■ Change



Healthcare Energy End Uses

- Space heating, lighting, and water heating are the largest energy uses in U.S. hospitals, followed by ventilation and cooling loads

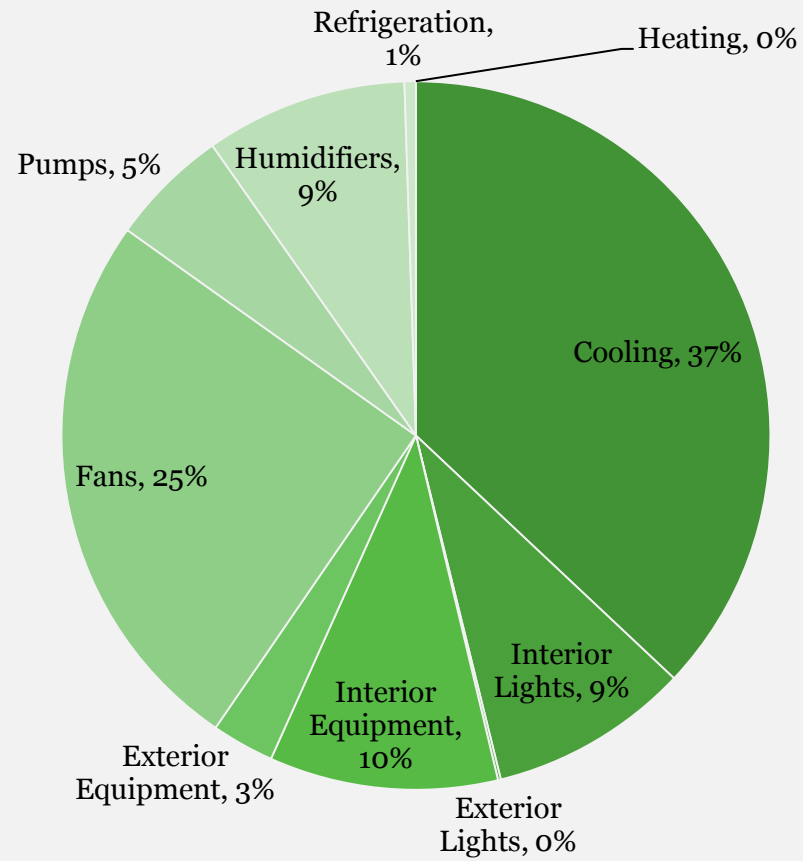


Notes: In the Electricity pie (A), "Other" consists of multiple categories including office equipment, water heating, and cooking; sum may not total 100% due to rounding.

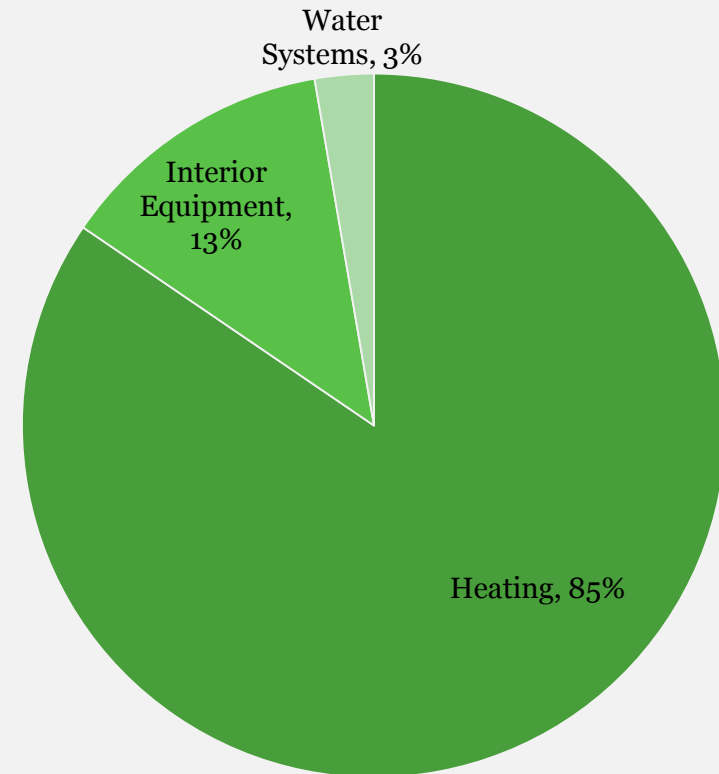
© E Source; data from the U.S. Energy Information Administration

Climate Zone 4a Energy End Uses

Electricity



Natural Gas



Source: National Renewable Energy Laboratory, Sep 2010

Year over Year Energy Costs



Electricity Costs	2011 Maryland Hospitals Surveyed	2012 Maryland Hospitals Surveyed
Average Cost per kilowatt hour	\$0.097	\$0.093
Cost per square foot	\$3.50	\$3.33
Cost per licensed bed	\$7,231	\$6,923

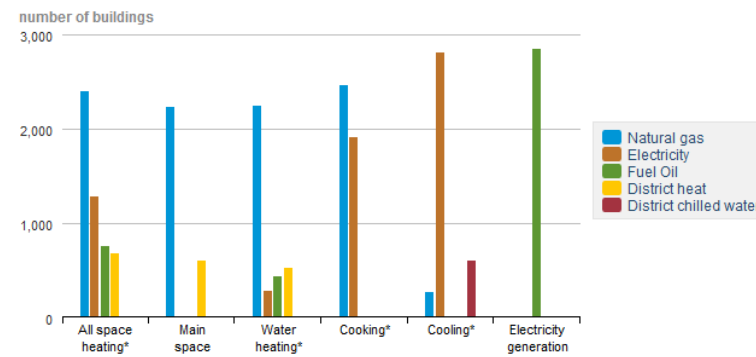
Natural Gas Costs	2011 Maryland Hospitals Surveyed	2012 Maryland Hospitals Surveyed
Cost per square foot	\$1.28	\$1.07
Cost per licensed bed	\$2,708	\$2,308

Total Energy Costs	2011 Maryland Hospitals Surveyed	2012 Maryland Hospitals Surveyed
Total Energy Costs per square foot	\$4.78	\$4.40

Hospital Energy Use Comparisons



Figure 1. Fuels and Energy End Uses in Large Hospital Buildings, 2007



Source: U.S. Energy Information Administration, Commercial Building Energy Consumption Survey, 2007



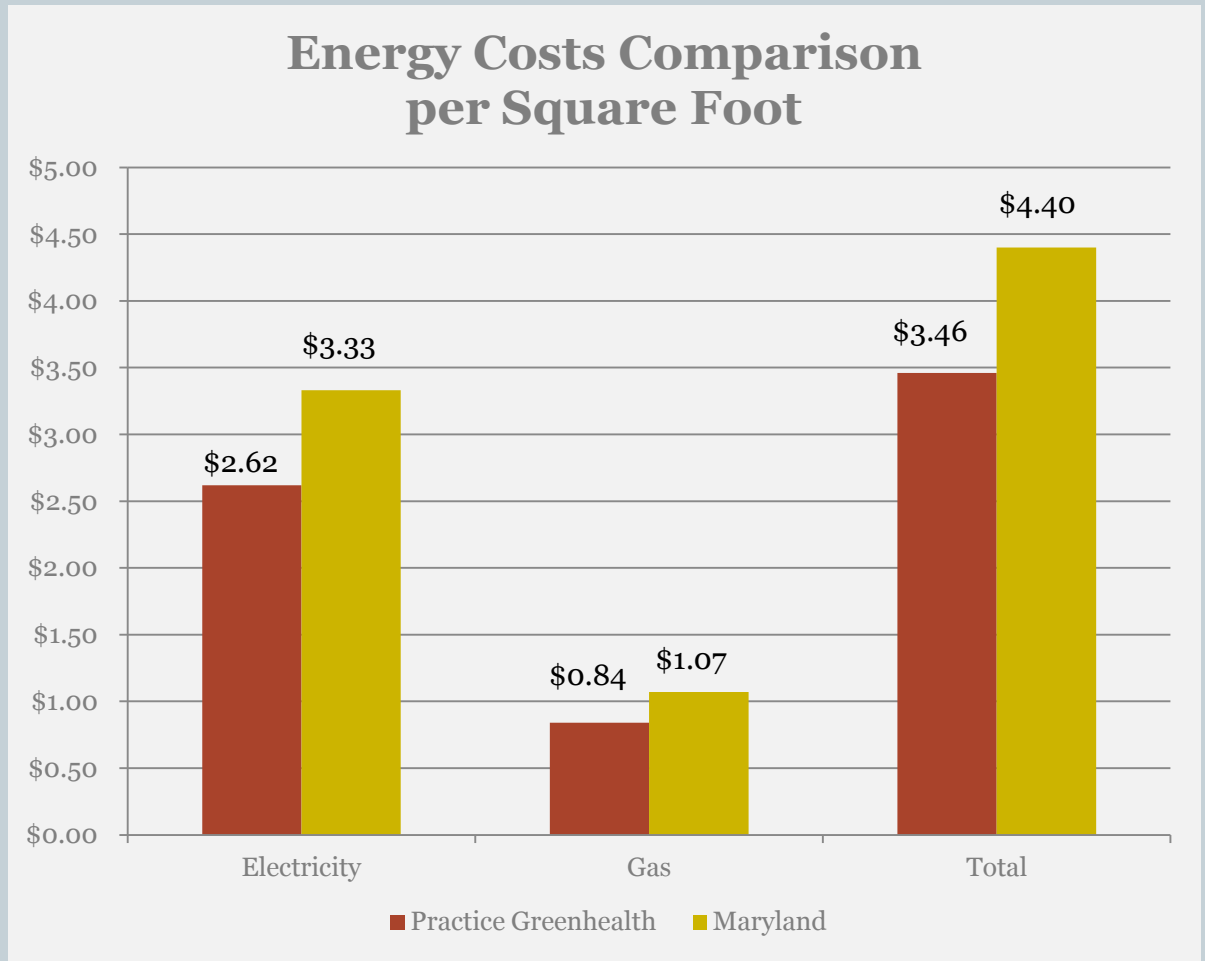
Energy Costs Comparison



Electricity Costs	2012 Practice Greenhealth Hospital Winners	2012 Maryland Hospitals Surveyed
Average Cost per kilowatt hour	\$0.09 (range: \$.01-\$.31)	\$0.093
Cost per square foot	\$2.62	\$3.33
Cost per licensed bed	\$6,652	\$6,923

Natural Gas Costs	2012 Practice Greenhealth Hospital Winners	2012 Maryland Hospitals Surveyed
Cost per square foot	\$0.84	\$1.07
Cost per licensed bed	\$2,150	\$2,308

Total Energy Costs	2012 Practice Greenhealth Hospital Winners	2012 Maryland Hospitals Surveyed
Total Energy Costs per square foot	\$3.46	\$4.40



Energy Use Intensity



What is it?

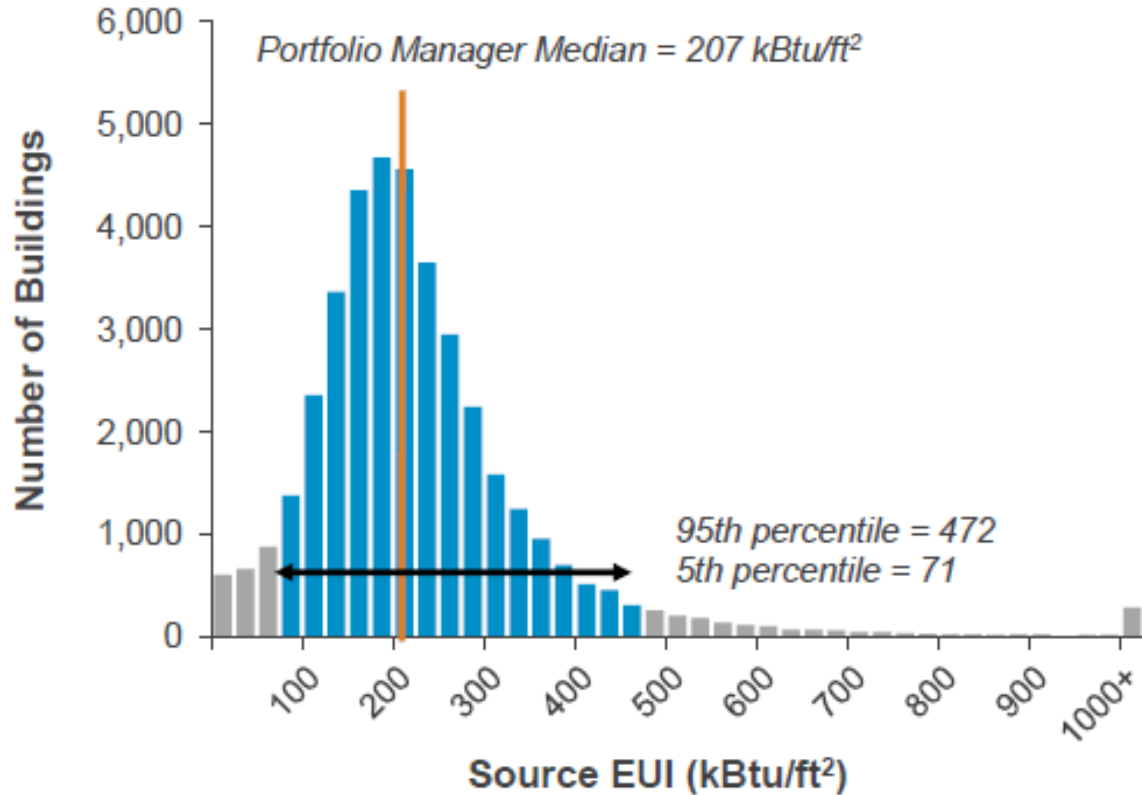
- A metric commonly used to evaluate energy use
- Calculated by dividing the total energy consumed by the building in one year by the total gross floor area of the building.

Some property types are more energy intensive than others

- Generally, a low EUI signifies good energy performance.
- However, certain property types will always use more energy than others. For example, an elementary school uses relatively little energy compared to a hospital.

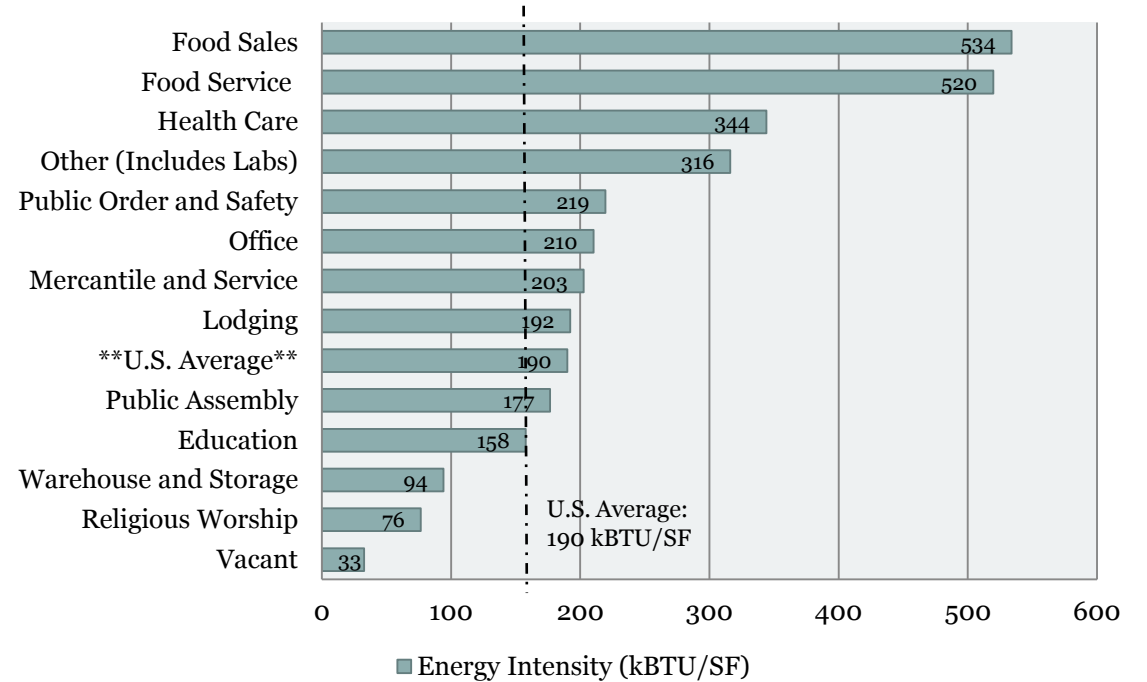


Energy Use Intensity



Source: U.S. EPA, ENERGY STAR

Primary Energy Use Intensity for Commercial Buildings 2003



Source: U.S. Energy Information Agency, CBECS 2003

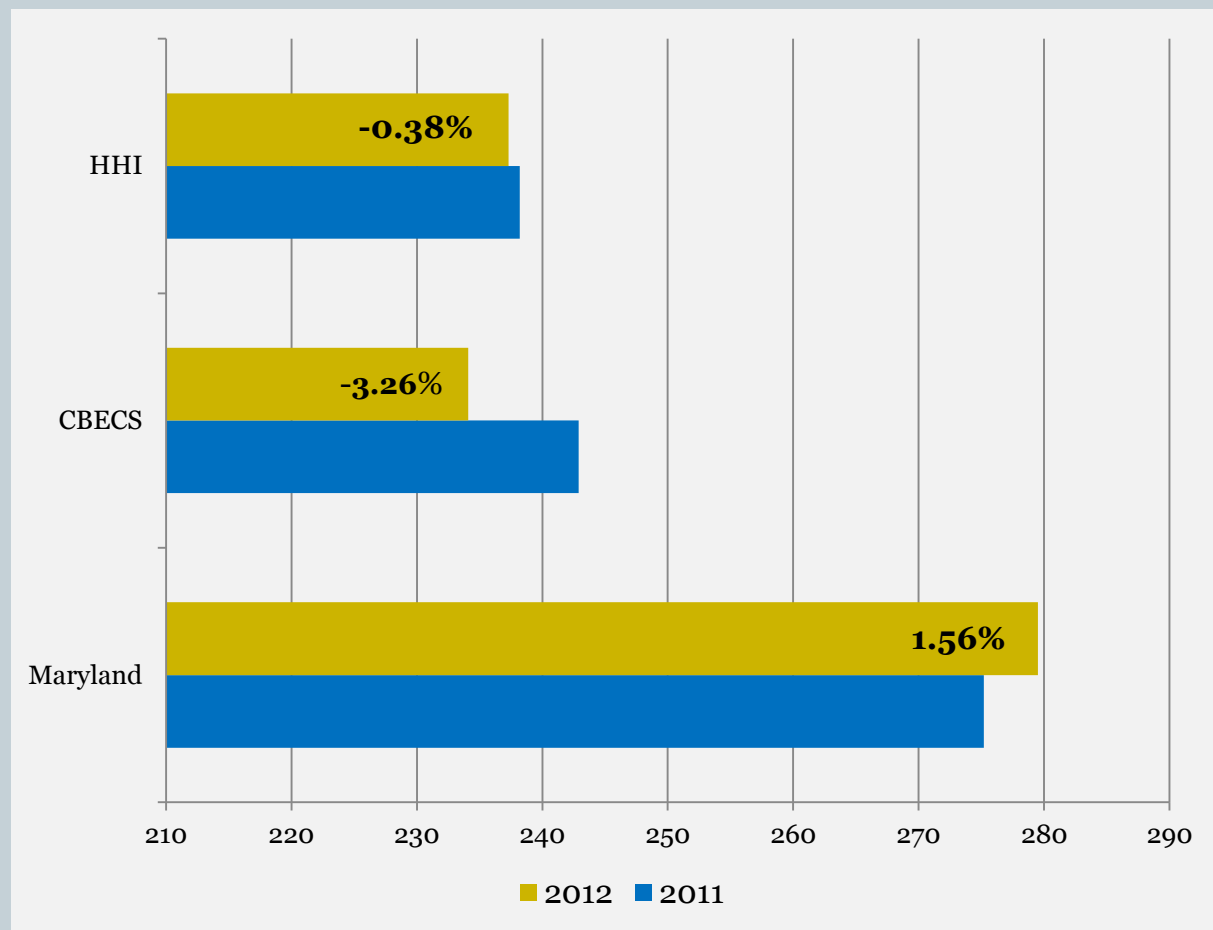
EUI and Costs Comparison



Maryland Hospitals Surveyed	2011	2012	Change
Energy Use Intensity (kBtu / ft ²)	275.2	279.5	1.56 %
Cost per square foot	\$4.71	\$4.39	- 6.67 %
Energy Use Intensity (kBtu / beds)	586,266	588,056	0.31 %
Cost per licensed bed	\$9,874	\$9,158	- 7.25 %

CBECS 2007	2003	2007	Change
Energy Use Intensity (kBtu / ft ²)	242.9	234.1	- 3.62 %

HHI 2012	2011	2012	Change
Energy Use Intensity (kBtu / ft ²)	238.2	237.3	- 0.38 %



Energy Conservation Examples Implemented at Maryland Hospitals



- Energy efficiency lighting (97% of PGH award winners have implemented this)
 - Removed (180) 175w metal halide fixtures and replaced with 40w LED fixtures.
 - Savings : \$26,806 per year + \$76,250 rebate from utility company
 - Payback: 16 months
- Variable frequency drives (87% of PGH award winners have implemented this)
 - Installed variable frequency drives (VFD) and control components on six cooling tower fan motors, four air handling units, and three chilled water booster pumps.
 - Energy Savings: 1,877,350 kWh per year
 - Cost Savings: \$113,000 per year + \$24,000 rebate from utility company
 - Payback: one year
- Minimize leakage in air handling units (87% of PGH award winners have implemented this)
 - Repaired leaking pre-heat coil
 - Energy savings: 235,000 kWh per year
 - Cost savings: \$23,000 per year
- Operate chiller plants to reduce overall plant energy consumptions (87% of PGH award winners have implemented this)
 - Reconfigured and modernized ability to effectively and efficiently produce and distribute chilled water to the numerous HVAC units located throughout the Hospital
 - Energy savings: Estimate 697,760 kWh per year
 - Cost savings: Estimate \$155,833 per year

What Now?

