Improving Patient Care through Energy to Care

2/14/19

AHA Data & Insights

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Agenda

- Background
- The WHY?
- Energy to Care
  - Benchmarking Tool
  - Education
    - Overview of Case Studies and Projects
  - Energy to Care Treasure Hunt
  - Awards and Recognition
- Upcoming ASHE Events

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Background

Sustainability

Sustainability is based on a simple principle:
Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment.

To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations.

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Electricity Units

Commonly used for cooling systems, electricity is typically measured in kilowatt hours (kWh), a measurement of energy equivalent to 3,412.14 BTU.

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Natural Gas Units

Commonly used for heating systems, natural gas is typically measured in therms, a measurement of energy equivalent to 100,000 BTU.

Another common unit for measuring natural gas is 100 cubic feet (CCF). 100 cubic feet (CCF) of natural gas equals 103,700 BTUs or 1.037 therms.

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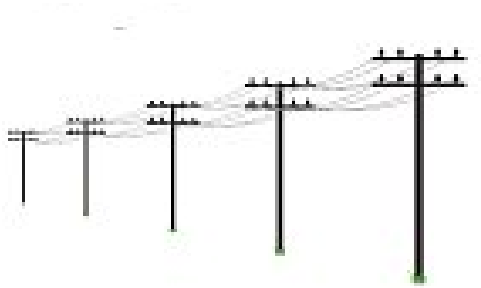
Energy Use Intensity

- Energy Use Intensity (EUI) is a metric that is often used in comparing energy use in buildings. EUI is simply energy consumption per unit of area of the building's floorplan. It allows you to compare the energy consumption of buildings that are different sizes.



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Energy Use Intensity – Source EUI vs Site EUI

- Energy Use Intensity (EUI)
- ***Site EUI*** – the amount of heat and electricity consumed by a building as reflected in your utility bills. Looking at site energy can help you understand how the energy use for an individual building has changed over time.

* From www.energystar.gov/buildings

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Energy Use Intensity – Source EUI vs Site EUI

- Energy Use Intensity (EUI)
- ***Source EUI*** – EPA has determined that source energy is the most equitable unit of evaluation. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses. By taking all energy use into account, the score provides a complete assessment of energy efficiency in a building.

* From www.energystar.gov/buildings

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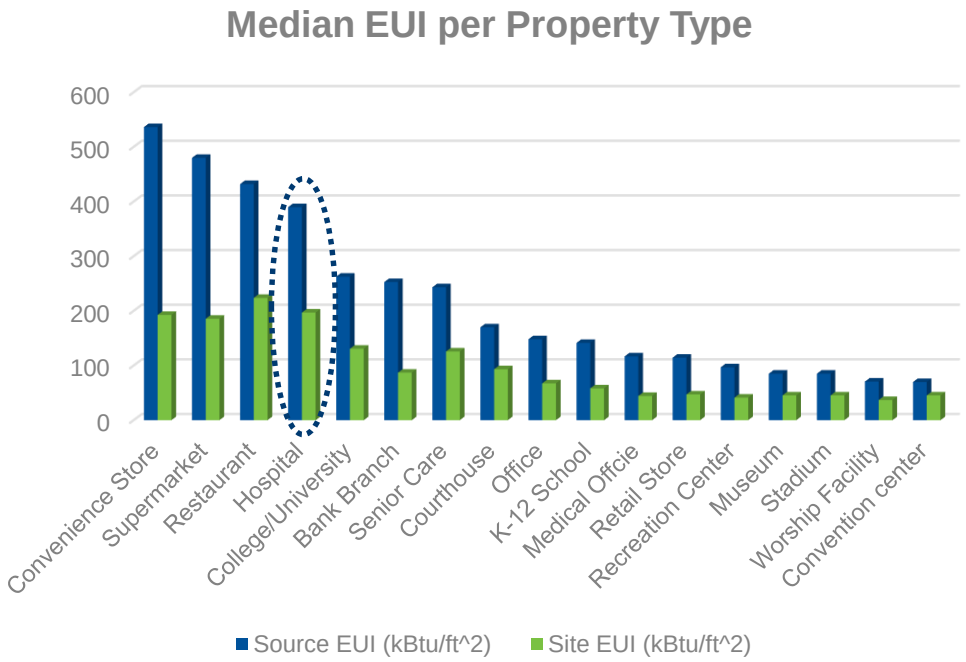
Why EUI and Energy Savings are Important in Healthcare

Energy Use in Healthcare



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* From Energy Star Portfolio Manager Technical Reference – U.S. Energy Use Intensity by Property Type

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Impact of this Demonstrated Approach

"A **triple bottom-line sustainability framework** offers a comprehensive focus on a project's impact on the economic cost (profit), environmental cost (planet), and social cost (people, i.e., occupants comfort and productivity).

The introduction of triple bottom line accounting for decision-makers in the built environment may be the most critical catalyst for investments in building energy improvements."

**Excerpted from CBERD publications – Reshma Singh*

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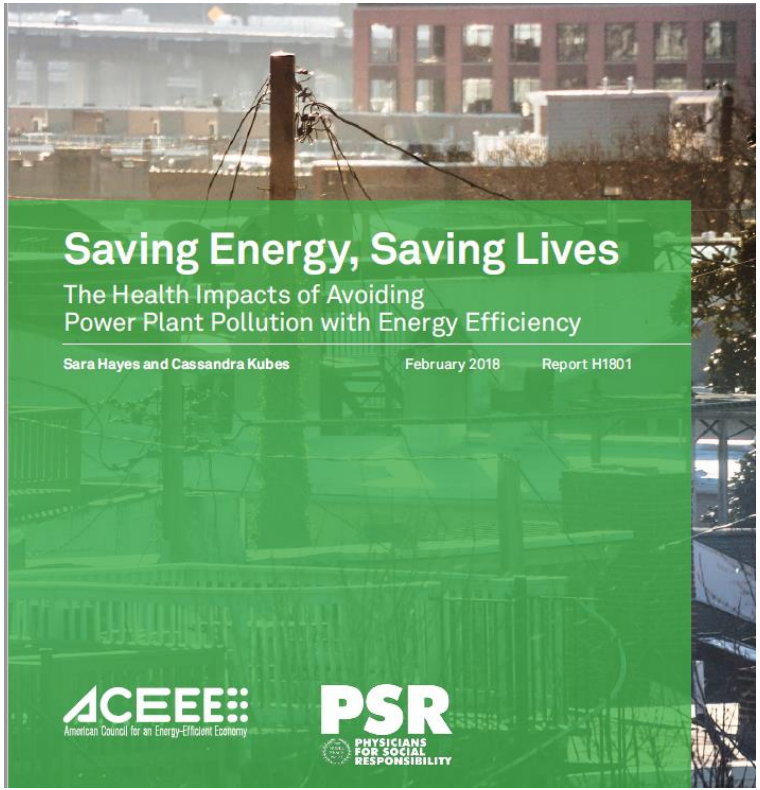
Report – Saving Energy, Saving Lives



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Report – Saving Energy, Saving Lives

"Nationwide, reducing electricity consumption by 15% for a single year would result in

- ***More than six lives saved each day***
- ***Up to $20 billion in avoided health harms***
- ***Nearly 30,000 fewer asthma episodes***

The dollars saved through avoided health harms in our scenario would be enough to pay the annual health insurance premiums for nearly 3.6 million families."

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Report – Saving Energy, Saving Lives

Social and Environmental focus can assist in the Advancement of Affordability in healthcare

Greatest per capita savings were seen in the Eastern half of the United States, benefits can be seen across all regions in the US

Figure 4. The interconnected nature of interstate ozone pollution. CSAPR refers to the Cross-State Air Pollution Rule, an emissions regulation limiting power plant pollution that crosses state lines. *Source:* EPA 2017d.

Rank	State	Dollars per capita
1	West Virginia	$184
2	Kentucky	$148
3	Pennsylvania	$140
4	Ohio	$137
5	Indiana	$128
6	Tennessee	$124
7	Alabama	$106
8	Michigan	$105
9	Delaware	$103
10	Arkansas	$98
11	Missouri	$89
12	Virginia	$89
13	Mississippi	$89
14	Illinois	$87
15	Maryland	$87

Table ES1. Top 15 states based on avoided health harms, per capita (US$)

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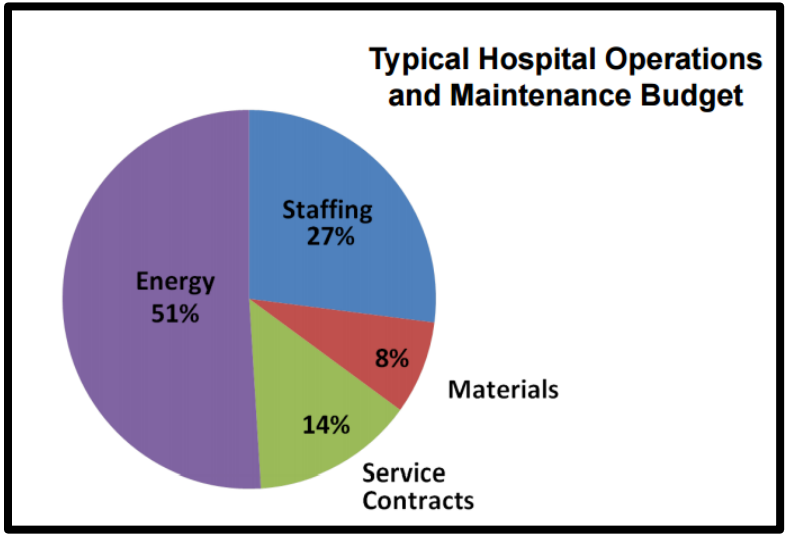
Financial Impact

Health Care and Energy Quiz

Energy Costs are typically **51%** of a health care facility department's budget.



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Health Care and Energy Quiz

One dollar of energy savings is worth about **$20** in revenue.

- At a 5% Operating Margin for every $1 in gross revenue
  - $0.95 is required to cover the expense of providing services
  - $0.05 is left to fund other expenses

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Health Care and Energy Quiz

- Impact of the Operating Margin

Operating Margin	For Each Revenue Dollar To Cover Exp/Avail $'s	Amount of Revenue to Generate $1
7%	$0.93 / $0.07	$15
5%	$0.95 / $0.05	$20
2%	$0.98 / $0.02	$50

The smaller the operating margin,
the greater value of each dollar saved!

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Why Should I Participate?

Reduce BTUs, **not** FTEs.

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ASHE Energy to Care Program

Energy to Care Program History

- Originally established in 2006 as the Energy Efficiency Commitment (E2C) Program
- Free benchmarking and awards program specifically for health care facilities management professionals
- Peer-to-Peer comparison on energy efficiency and reduction efforts
- Annual award program that recognizes hospitals for energy efficiency achievements

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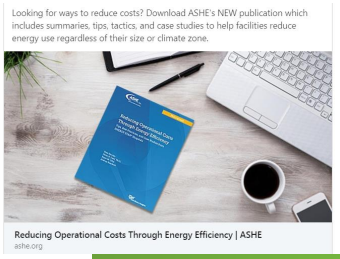
Evolution of the Energy to Care Program

Energy to Care Benchmarking Tool

You Can't Manage What you Don't Measure!

Education



Energy to Care Treasure Hunt Program

Awards and Challenges

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Energy to Care Benchmarking

What is Energy to Care - Benchmarking?

- Energy to Care is a complimentary program to help health care facilities **monitor**, **reduce**, and **communicate** energy consumption.
  - Energy dashboard

Energy data remains <u>confidential</u>!

energytocare.org

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is sponsored by: Johnson Controls

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EPA Energy Star

The 1 – 100 ENERGY STAR score is a screening tool that helps owners assess how a building is performing.

A score of 50 is the median, and a score of 75 or higher means it's a top performer and may be eligible for ENERGY STAR certification.

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Portfolio Manager | Key Inputs

Enter Use Details:

- Verified Gross Floor Area (GFA)
- Year of Construction
- Operating Hours
- Number of Full-Time Equivalents (FTEs)
- Number of Staffed Beds
- Parking, Data Centers, and Pools
- 12 Months of Utility Data
- Number of Total Meters
- Clinical Equipment

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Benchmarking Reporting Model

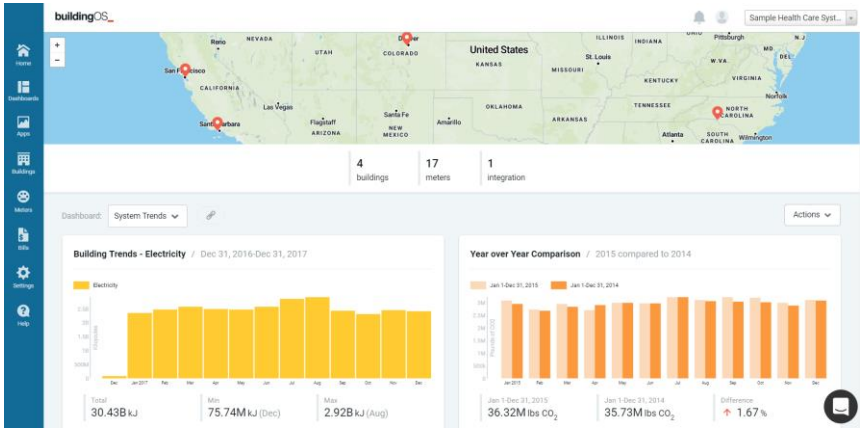
- Current Energy to Care Model

FM inputs building and utility data in **Energy Star Portfolio Manager**

FM Shares Data with ASHE

FM Shares Data with Lucid Building OS

ASHE buildings dashboard in Building OS



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ENERGY TO CARE - CONFIDENTIALITY

Data confidentiality appears to be a common concern among hospitals considering whether to participate in Energy to Care or not.

Data *will not* be distributed or shared with any other entity without the express written consent of the participating healthcare system.

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Advancements in the Energy to Care Program

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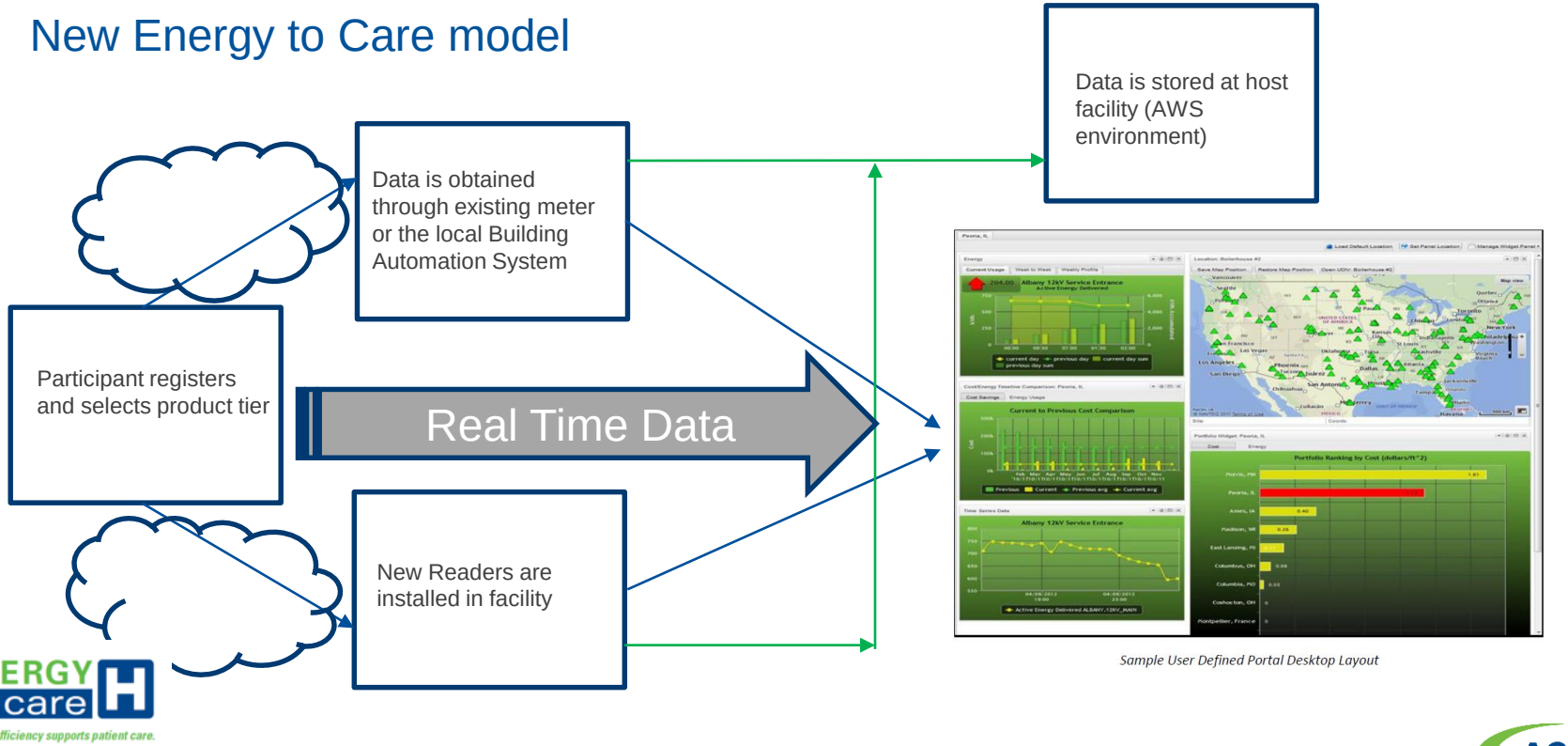
Proposed Reporting Model

- New Energy to Care model



Sample User Defined Portal Desktop Layout

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Benchmarking Reporting Model

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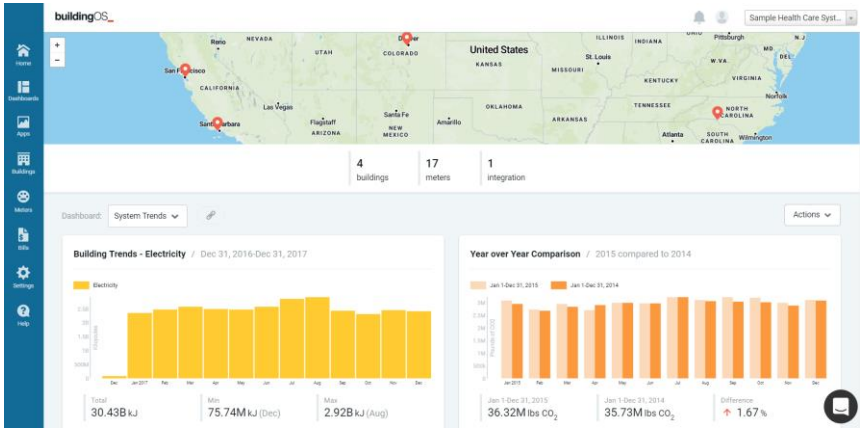

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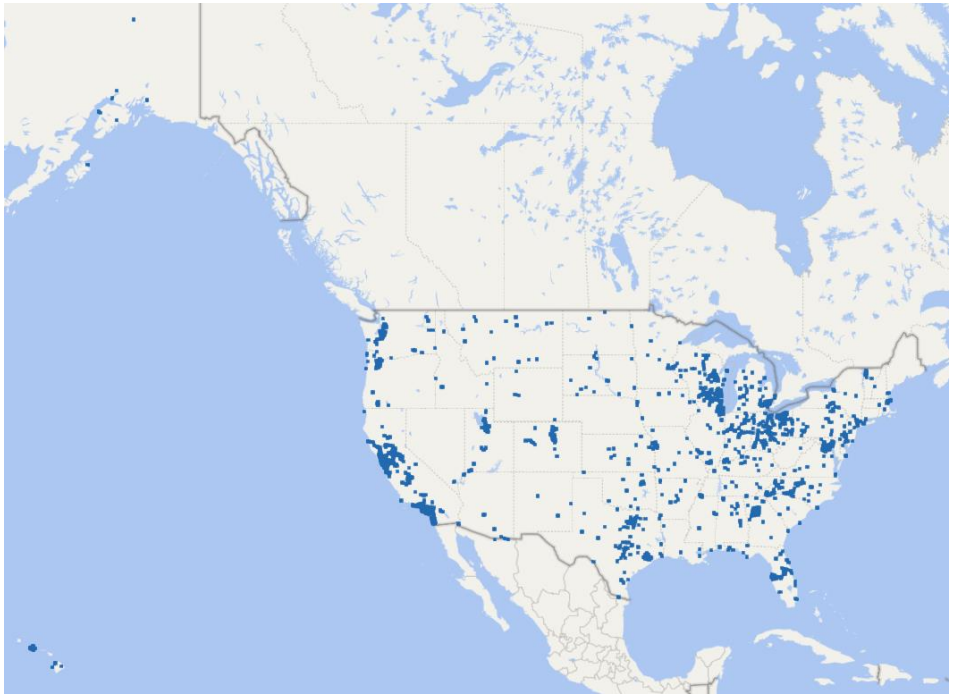
Current Energy to Care Participation

- OVER ***3,400*** Participating Facilities



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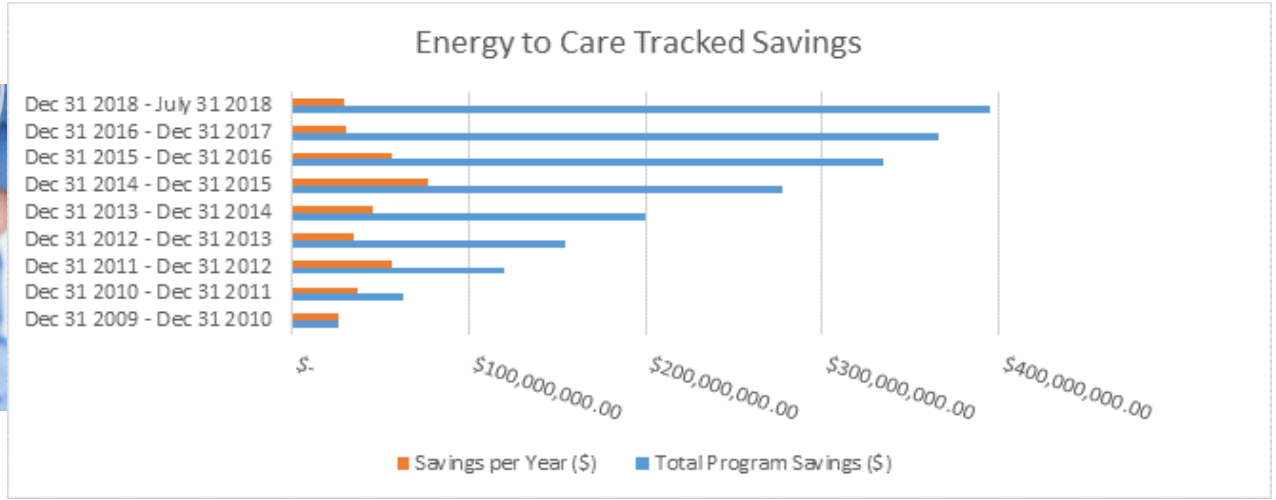
Financial - Total Program Savings

Since 2010, hospitals and health care facilities participating in ASHE's Energy to Care program have put **more than *$395 million dollars* in energy savings back into patient care.**



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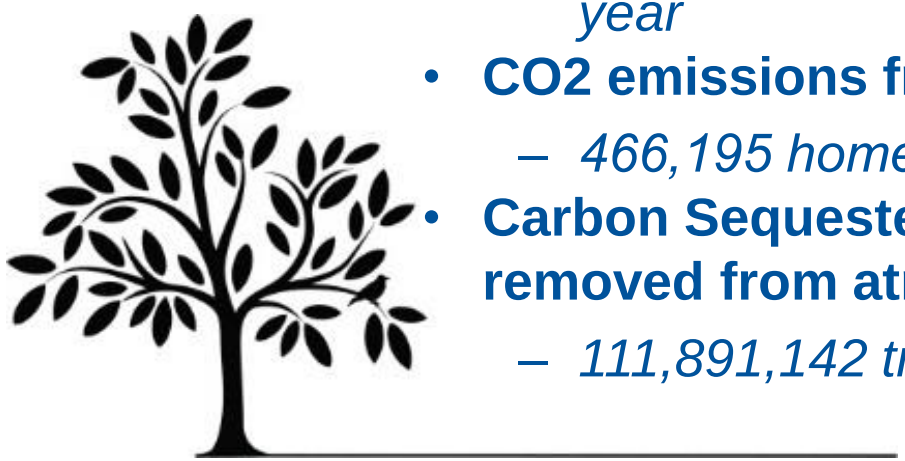
Environmental – Total Program Savings



- **Greenhouse gas emissions from:**
  - *924,503 passenger vehicles driven for one year*
- **CO2 emissions from:**
  - *466,195 homes' energy use for one year*
- **Carbon Sequestered from (carbon dioxide removed from atmosphere and held):**
  - *111,891,142 tree seedlings grown for 10 years*

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Social – Total Program Savings

Total program savings of $395,402,800 translates to the equivalent of **health insurance premiums for 1 year for *83,843 individuals***

Average yearly savings of $43,933,644 translates to the equivalent of **health insurance premiums for 1 year for *9,316 individuals***

Based on 2017 Average individual insurance premium (without subsidies) = $393/month, $4,716/year

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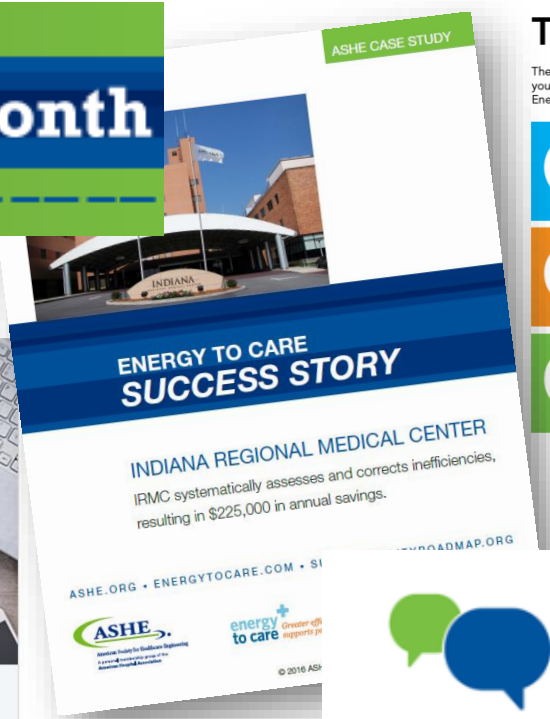
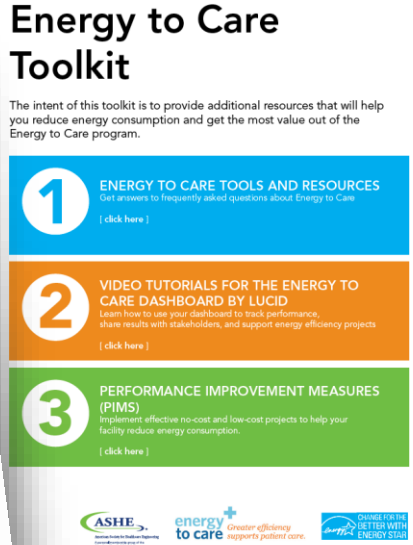
Energy to Care Educational Resources

Energy to Care – Educational Resources

Looking for ways to reduce costs? Download ASHE's NEW publication which includes summaries, tips, tactics, and case studies to help facilities reduce energy use regardless of their size or climate zone.

Reducing Operational Costs Through Energy Efficiency | ASHE
ashe.org





myASHE
online member community

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Examples of Existing Building Considerations Provided in the ASHE Energy to Care Educational Resources

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Start with the “Obvious”

Control Strategies

- ***OFF*** is free!
- Analyze Overrides
- Analyze Failed Points
- Develop internal policy for overrides and changing setpoint – Enforce the policy!
- AHU and VAV on/off schedule

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Thermostats and Variable Air Volume

- **Limit Thermostat Adjustability**
  - Success Story – St. Anthony Hospital, Lakewood, CO
  - Reduce adjustability from +/-5 to +/-3 degrees
  - $340 to implement, $38,000 annual savings
- **Implement Thermostat Dead Band**
  - Primary air flow has been reduced to it's minimum before activating reheat.

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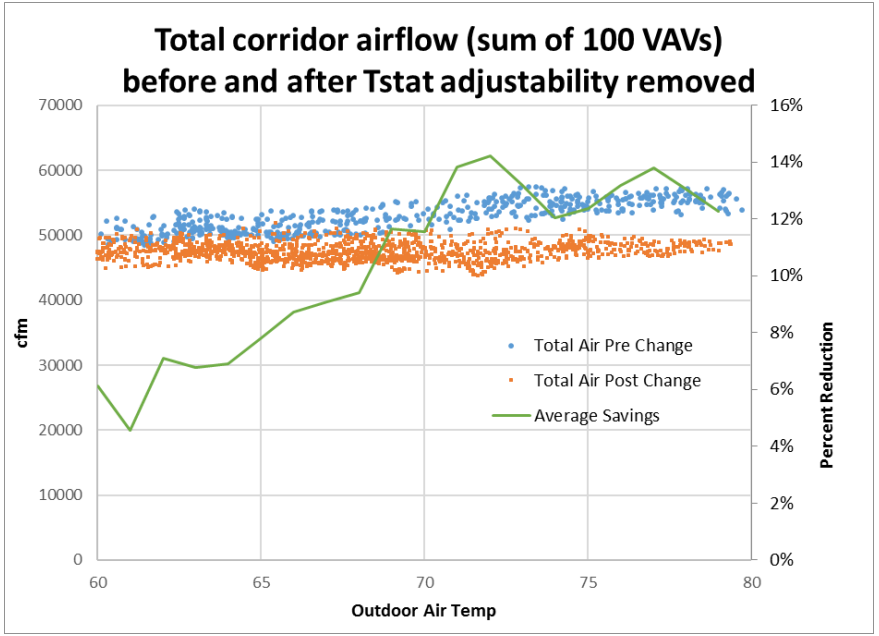
Thermostats and Variable Air Volume

- **Lock Out the Thermostat Adjustability in Common Areas**
- Success Story - UF Health
  - Corridors account for 25% square footage
  - 8 hours to implement
  - $10,000 annual savings
  - Corridors were accounting for 15% of total hospital airflow.



Data credit to UF Health, analysis by Envinity, Inc. Reprinted with permission.

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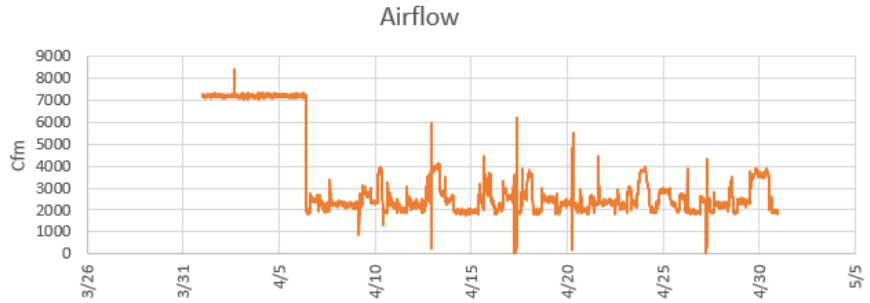
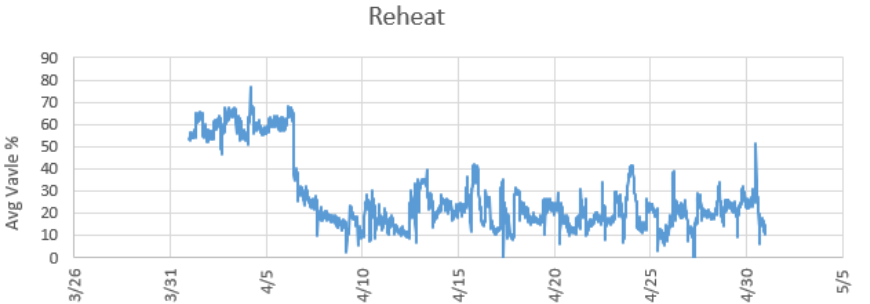
Reduce Airflow when Code Allows

- Operating Room total Air Changes per Hour should be balanced to achieve code minimum of 20 ACH.

- Success Story – UF Health
  - Reduced Airflow in Blood Lab
  - 4500 cfm reduction
  - $11,000 annual savings





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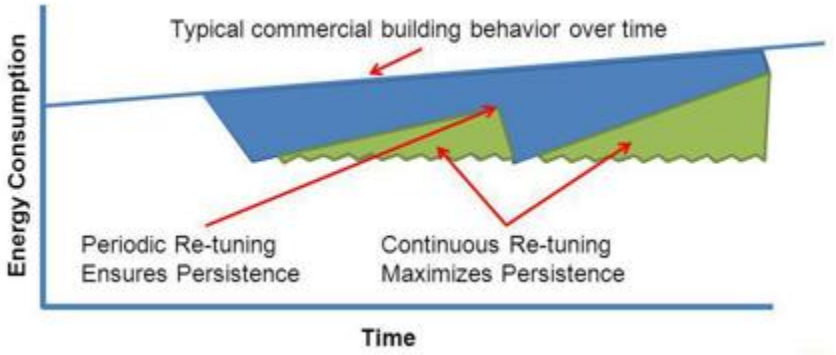
Optimization Using Fault Detection Diagnostics

- Fault Detection Diagnostics (FDD)
- Continuously collect performance data from BAS
- Identifies potential faults
- Provides operator with real-time list of prioritized faults, visualization tools, etc.



Printed with permission from Srinivas Katipamula, 2011. Commercial Building Re-Tuning. Presented at Better Building by Design conference. Burlington, VT

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Other Considerations – Existing Building

- ***Electricity***
  - Switch to LED
  - Occupancy Sensors
  - Turn Off the Lights Campaign
- ***Optimize Your Chillers***
- ***Add Heat Recovery Elements***
- ***Use Variable Frequency Drives***

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Examples of New Building Considerations Provided in the ASHE Energy to Care Educational Resources

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Sustainability During Building/Construction Projects

New construction	
Decreased operating costs (over one year)	11%
Decreased operating costs (over five years)	28%
Payback time for green investments (in years)	7

Source: https://www.energystar.gov/buildings/facility-owners-and-managers/new-construction/why-design-earn-energy-star

- Plan for Energy Savings
- Have the Whole Team on Board Early
- Show the Big Picture

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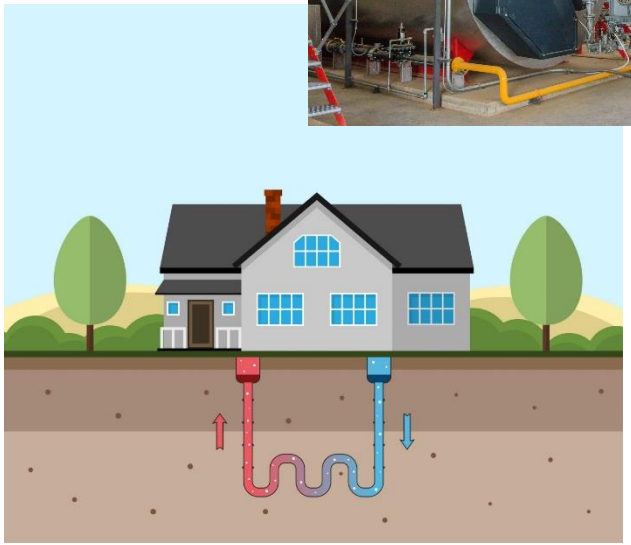
Strategies to Consider

- Combined Heat and Power
- Heat Recovery Chiller
- Boiler Plant Heat Recovery Techniques
- Geothermal Design
- Whole Building Commissioning



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Examples of Renewable Energy Considerations Provided in the ASHE Energy to Care Educational Resources

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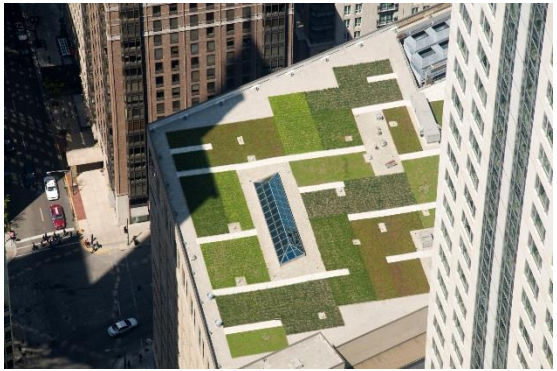
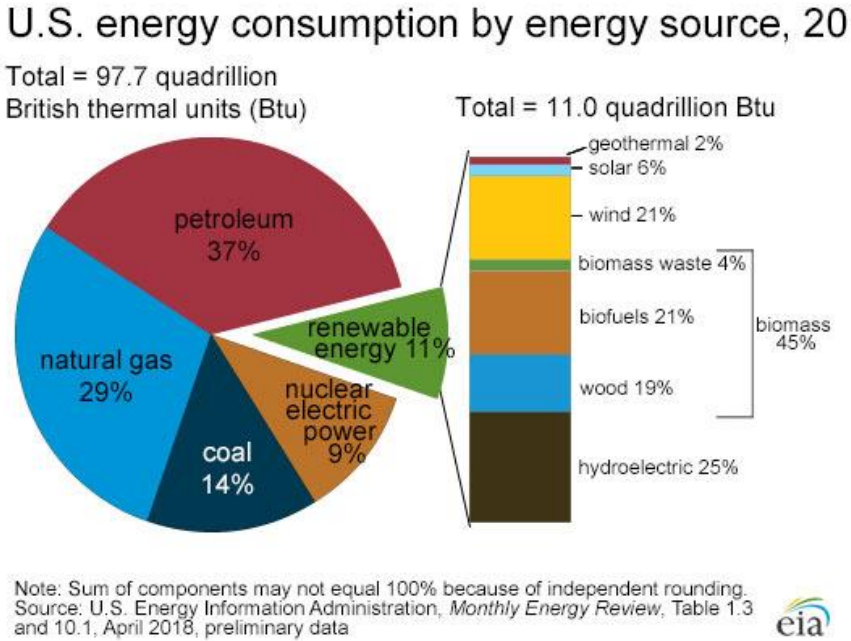
Types of Renewable Energy



- Solar Photovoltaic
- Solar Thermal
- Wind
- Geothermal
- Biomass



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Implementing Renewable Energy

- Consider the following Factors to determine if renewable energy is a good fit for your facility:
  - Availability
  - Cost
  - Incentives
  - Financing

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Energy to Care Treasure Hunts

ASHE Energy to Care Treasure Hunt

Participate in an Energy Treasure Hunt!

Participants learn to identify low cost/no cost measures for efficiency as well as Capitol Measures.

Treasure Hunts result in a culture change geared toward efficiency.

Engage layers of personnel

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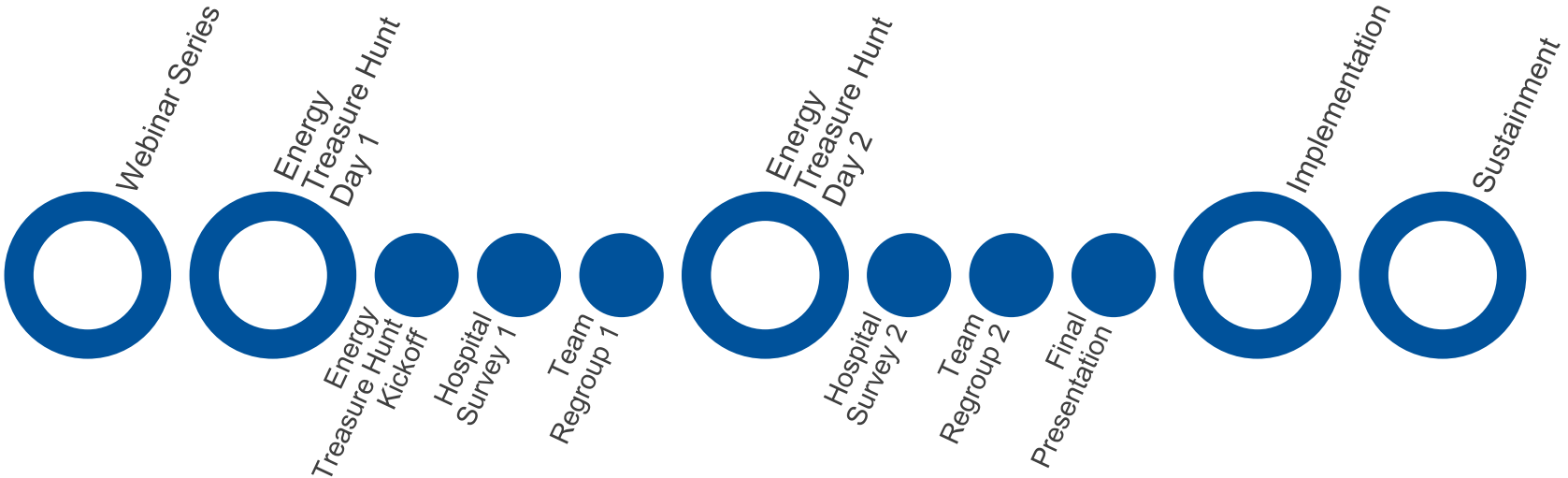
ASHE Energy Treasure Hunt Process



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Key Learning Objectives

- Adopt a culture of continuous improvement to reduce energy consumption and cost
- Identify no- and low-cost energy savings opportunities
- Engage and train hospital staff from all departments
- Create facility action plans
- Establish and assign project implementation responsibilities

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Previous Treasure Hunt Opportunities

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HVAC Balance/Bldg Envelope

Many exhaust fans on the roof have been abandoned in place, with a couple of AHU running at 100% full speed, as well as atrium with open windows.

Savings: $8,394/Year
Implementation: $130
Payback Period: 0.02 Years

Discharge Air Temperature reset

Reset discharge air temperature based on outside air conditions for the 6 constant volume air handlers serving A-win patient floors.

Savings: $25,970/Year
Implementation: $4,480
Payback Period: 0.17 Years

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A-wing Lighting

CURRENT						
	Light Type	Lamps	Wattage Per	Load Factor	Hours	Total kWh
	F32	1620	32	0.7	8760	317882.88
	CFL	250	13	0.4	8760	11388
	Incandescnet	35	60	0.4	8760	7358.4
						336,629
FUTURE						
New Type	Old Type	Lamps	Wattage Per	Load Factor	Hours	Total Wattage
F24	F32	1620	24	0.7	8760	238412.16
LED	CFL	250	10	0.4	8760	8760
LED	Incandescnet	35	10	0.4	8760	1226.4
						248,399

Savings: $6,617/Year
Implementation: $0
Payback Period: 0 Years

Replace bulbs at end of life.

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Low flow flush valves

Replace existing 3.5 gpm flush valves with 1.6 gpm low-flow valves

@ 4 flushes/day
Savings: $5,200/Year
Implementation: $13,100
Payback Period: 2.5 Years

@ 10 flushes/day
Savings: $13,100/Year
Implementation: $13,100
Payback Period: 0.99 Years

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Energy to Care Awards Program

Energy to Care Awards Program

The **Energy to Care Awards** honor health care facilities that reduce energy consumption by 10% in a single year or by 15% over two years. The program also recognizes previous award winners that reduce energy consumption by 5%.

The **Energy Champion Award** is given out once per year to honor a single facility that has demonstrated outstanding leadership in energy efficiency.

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Be Recognized for Your Efforts!

Energy to Care Award winners are recognized each year at the ASHE Annual Conference. ASHE also sends a letter of congratulations and provides two plaques: one for the facility team member(s) and one for the hospital CEO (or other selected leader).

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History of the Chapter Challenge

- Challenge launched by 2 chapters in 2015 – 2016 recognition
- Challenge launched by ASHE in 2016 – recognized at 2017 Annual Conference
- Increase in participation – 18 chapters in 2019

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Recognition - Awards

- **ASHE Energy to Care Energy Cup**
- Revolving Trophy Recognizing Yearly Winners!
  - Chapter Award at Annual Conference
  - Award Presentation at Chapter Event
- **2018 Winners!**

HESNI Healthcare Engineers Society of Northern Illinois

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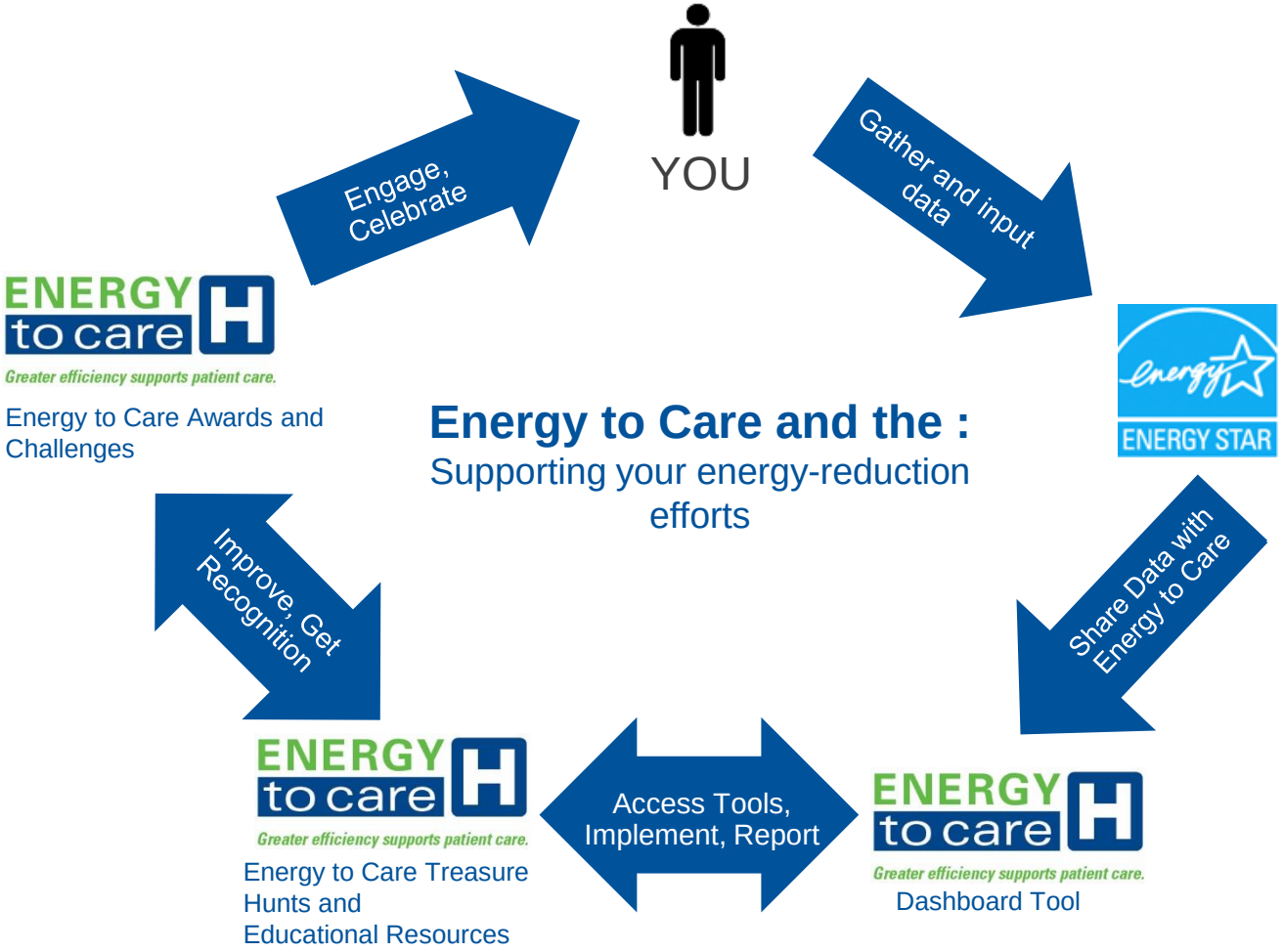

ASHE Conferences

Join us at ASHE's Upcoming Conference

INTERNATIONAL SUMMIT & EXHIBITION ON
HEALTH FACILITY PLANNING, DESIGN & CONSTRUCTION

MARCH 17-20, 2019 | PHOENIX, AZ

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Treasure Hunt

Phoenix Children's (Directly following the 2019 PDC Summit)
1919 E. Thomas Rd., Phoenix, AZ 85016
March 20–21, 2019

Registration is available through the PDC conference registration website.

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Join us at ASHE's Upcoming Conference

ENERGY to care
Greater efficiency supports patient care.

Treasure Hunt

Location to be announced soon!

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