

# How 2 Midwest hospitals are partnering with DOE to beat energy reduction goals

Photo by Jessica Moore/Getty Images



Presented by Practice Greenhealth & Department of Energy's Better Buildings Initiative  
Tuesday, September 17<sup>th</sup>, 2019

# Moderator

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Climate and Health Mitigation and Resilience Associate Director  
Lauren works on education and resources to help hospitals track and manage their greenhouse gas footprint and prepare their built environment and communities for climate change. Prior to joining the organization, Lauren earned master's degrees in environment and natural resources/public policy and administration from Ohio State University and has over 10 years of health care and sustainability experience.

# Session Objectives

- Understand the tools available via the Better Buildings Initiative, which include water and waste resources.
- Learn how to increase engagement for energy reduction with senior leadership and frontline employees.
- Discover the details behind Mayo Clinic's effort to educate over 200 environmental champions and UW Health's sustainability strategic plan.
- See how facility data and Practice Greenhealth's Energy Impact Calculator translates savings into health data.



# Session Speakers



**Allison Kirby**  
Better Buildings Health Care Expert  
RE Tech Advisors



**Mary Evers Statz**  
Energy Management & Sustainability  
Program Director  
UW Health



**Amanda Holloway**  
Director Office of Sustainability  
Mayo Clinic



**Brett Gorden**  
Section Head - Utility Operations,  
Energy Management, and  
Infrastructure Systems Engineering  
Mayo Clinic

Allison Kirby  
Better Buildings Health  
Care Expert  
RE Tech Advisors





# Better Buildings Initiative

Allison Kirby, Better Buildings Healthcare Account Manager



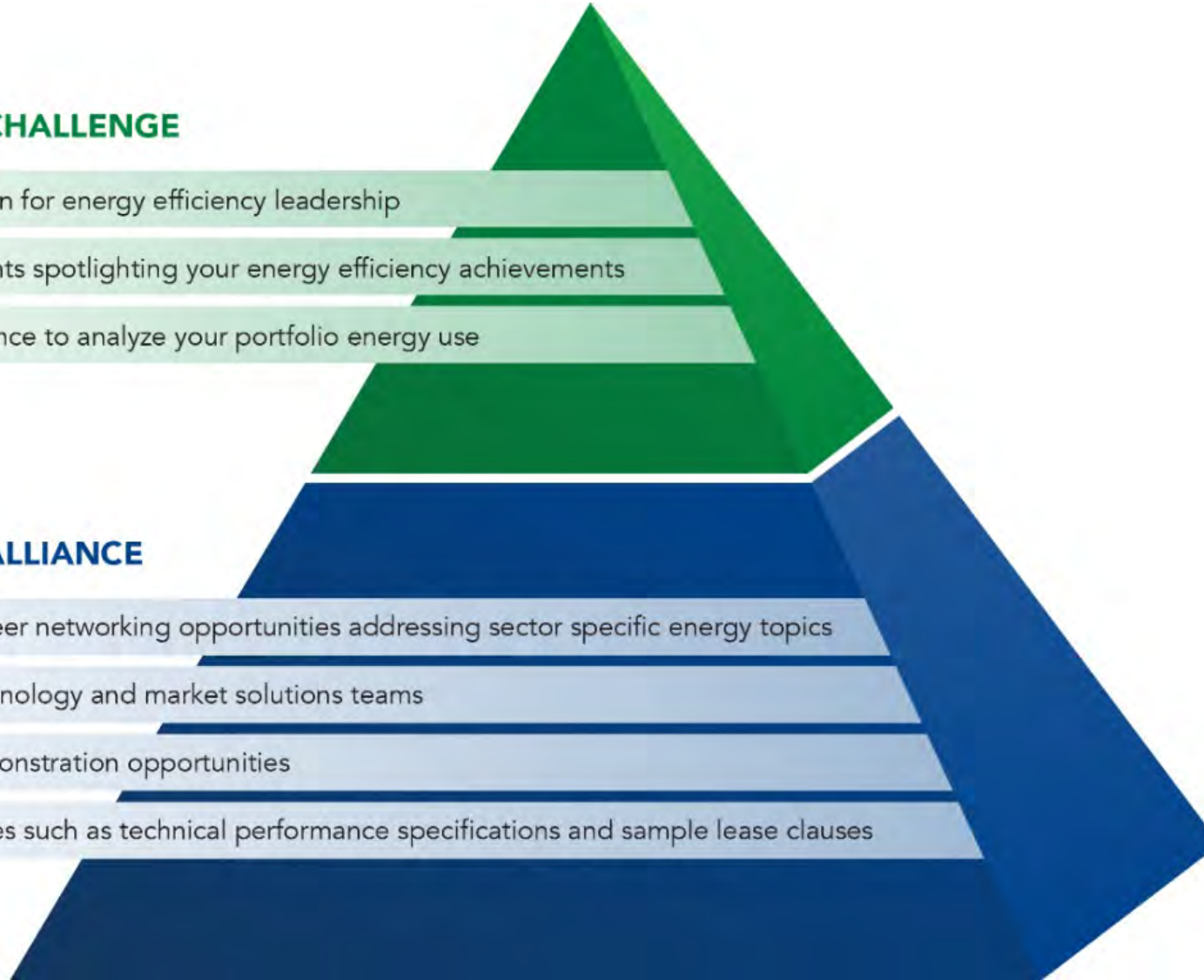
# Better Buildings Initiative

## STEP UP TO THE BETTER BUILDINGS CHALLENGE

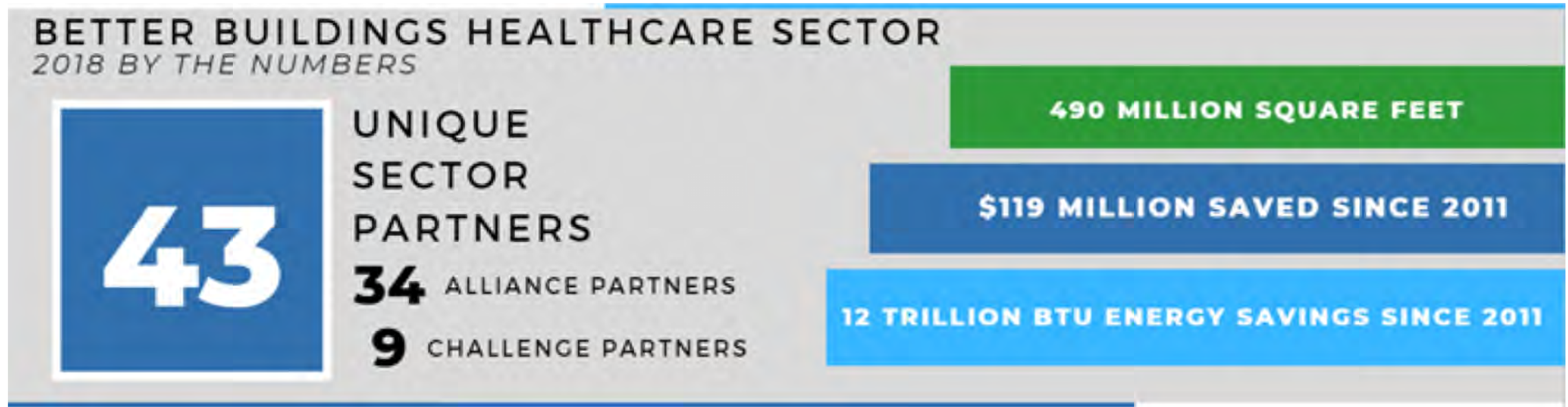
- ▶ Earn national recognition for energy efficiency leadership
- ▶ Join DOE in media events spotlighting your energy efficiency achievements
- ▶ Access technical assistance to analyze your portfolio energy use

## PARTICIPATE IN THE BETTER BUILDINGS ALLIANCE

- ▶ Participate in peer-to-peer networking opportunities addressing sector specific energy topics
- ▶ Tap into expert-led technology and market solutions teams
- ▶ Access technology demonstration opportunities
- ▶ Develop public resources such as technical performance specifications and sample lease clauses



# Better Buildings Healthcare Results to Date





# Better Buildings Solution Center



**More than 1,000 solutions are available publicly in the Better Buildings Solution Center**

## **Showcase Projects:**

- Large and small buildings
- All sectors
- Specific building types such as schools, hospitals, hotels, grocery stores, universities, civic centers, libraries, offices and labs

## **Implementation Models (Playbooks):**

- Overcome barriers: finance, data, energy management, staff training, community and customer outreach, partnering with utilities, and more
- Multi-faceted and applicable across sectors

**Other Resources, Case Studies, Guidance**



**BETTER INFORMATION**

Mary Evers Statz  
Energy Management &  
Sustainability Program Director  
UW Health





- UW Health's goal is to reduce our energy use intensity, or EUI, 20% by 2023. Progress toward this goal has begun in earnest and has included retro-commissioning several buildings, LED lighting upgrades, HVAC scheduling changes, temperature set-backs, HVAC occupancy sensors, high efficiency equipment, and demand reduction strategies. UW Health is committed to energy improvements that enhance both staff and patient comfort. UW Health has been a proud [ENERGY STAR Partner](#) since 2010. Our commitment also includes training several staff in the Building Operator Certification program.

#### CHALLENGE COMMITMENT

4.7 Million Square Feet

#### ENERGY GOALS

20% Reduction in Energy Intensity



#### PROGRESS



Goal Achieved

#### ENERGY GOALS

34% Reduction in Energy Intensity



#### PROGRESS

25% Cumulative (vs. Baseline)





## Agenda

- UW Health
- Our Energy Management Journey
- Retro-commissioning RCx
- Measures Implemented
- Our Future





Remarkable  
HEALTHCARE



- Integrated health system of the University of Wisconsin-Madison; clinical care and hospital entities are united.
- Serve more than **600,000 patients** in south central Wisconsin and northern Illinois.
- Approximately **1,500 physicians and 15,000 staff** at 7 hospitals and 87 clinics.



## Our Energy Management Journey

- 2010 benchmarking in Energy Star Portfolio Manager & engaged utility
- 2011 small victories-over 110K in incentives, 1M kWh, 10,000 therms
- 2012 presented to Senior Leaders - “Becoming a More Energy Efficient Organization”
  - Become an Energy Star Partner
  - Form an Energy Team
  - Share benchmarking data
  - Engage independent firms
  - Training-give Facilities the tools they need
  - Create a culture of awareness for conservation





# RCx at UW Health

- Focus on Energy Program statewide program 2012
- Second building in the state to enter the program
- UW Health's largest stand-alone clinic-1 S Park:
  - 1970/1996
  - 174,000 SF with 34,000 SF ASC & 15,000 SF Medical Imaging
  - 2 MRI's & 2 CT's
  - Parking Ramp
  - Numerous remodels
  - 225,000 Patients/Yr.
- \$50,000 study cost



# RCx at UW Health

- Savings
  - \$66,000/yr cost avoidance
- Expenses
  - \$50,000 study cost
  - \$32,000 implementation cost
- Incentive
  - \$63,000 incentive
- Simple Payback = 0.3 years (after incentive)

# University Hospital - RCx 2013

Measures Implemented	Total Cost Savings (\$/year)
Equipment scheduling and optimization	\$342,186
Daylighting and lighting controls	\$6,257
Fume hood and lab rebalancing	\$77,184



[Home](#) » [Solutions](#) » [Showcase Projects](#) » University Hospital



University Hospital

## Showcase Project: University Hospital

**SECTOR TYPE**  
Commercial

**LOCATION**  
Madison, Wisconsin

**PROJECT SIZE**  
1,700,000 Square Feet



### Annual Energy Use

(Source EU)



Energy Savings:  
**27%**

### Annual Energy Cost



Cost Savings:  
**\$2,250,000**



## UW Health Retrocommissioning Project Summary

Location	Year	Annual Electric Savings (kWh/yr)	Annual Gas/Steam Savings (therms/yr)	Annual Cost Avoidance	Project Cost	Simple Payback
1 S Park	2012	724,920 kWh	22,517 therms	\$ 66,000	\$ 82,000	15 months
University Hospital	2013	5,572,647 kWh	520,000 therms	\$ 488,075	\$ 486,124	12 months
Digestive Health	2015	1,752,426 kWh	66,404 therms	\$ 41,000	\$ 68,000	20 months
West Clinic	2016	413,887 kWh	35,119 therms	\$ 54,498	\$ 52,015	12 months
Swedish American Hospital	2017	1,220,737 kWh	43,699 therms	\$ 122,000	\$ 25,498	3 months
Swedish American Regional Cancer	2018	282,100 kWh	17,922 therms	\$ 32,000	\$ 10,000	4 months

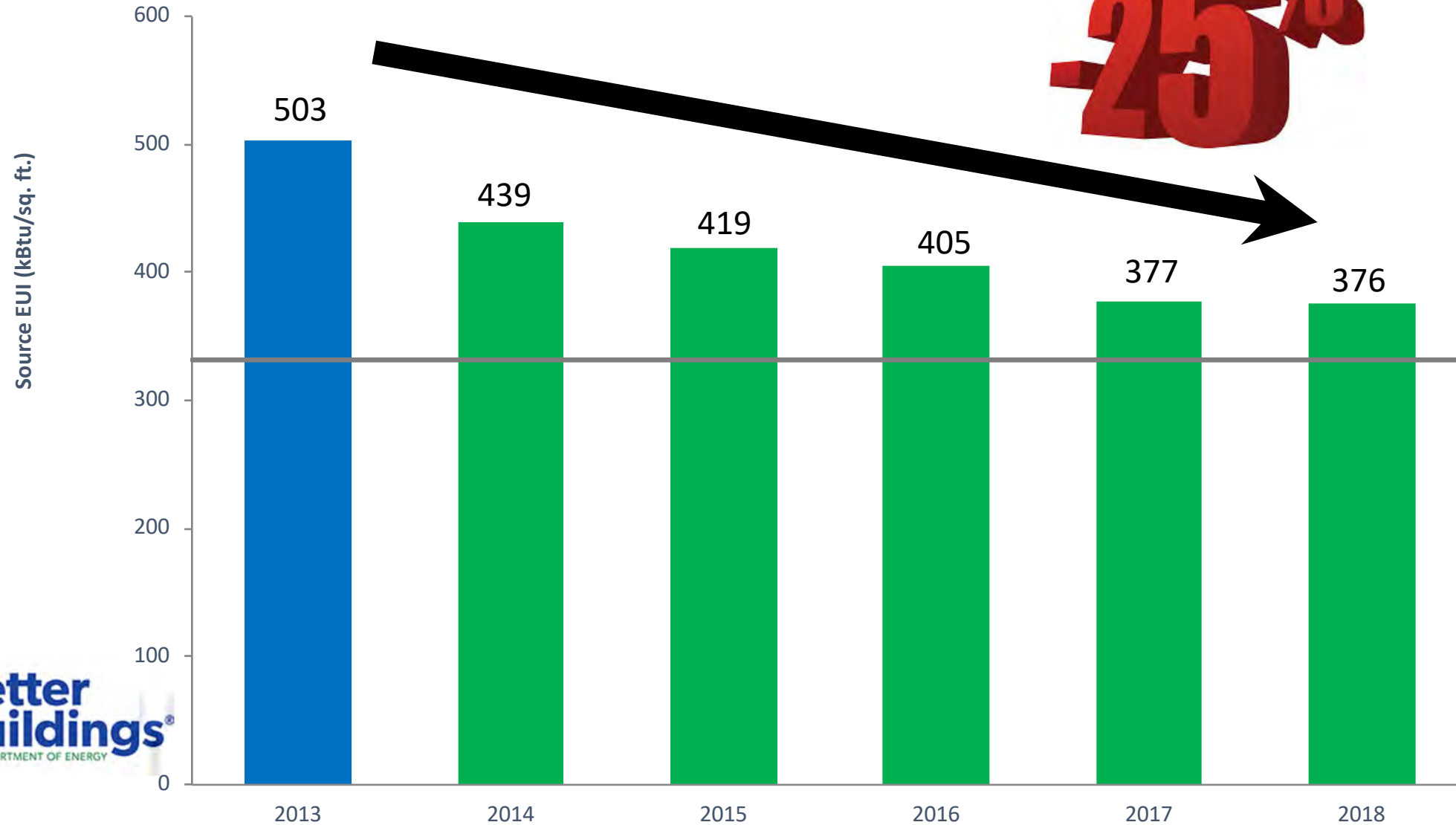
**TOTALS**    \$ 803,573    \$ 723,637    11 months

Utility incentives of over \$585,000

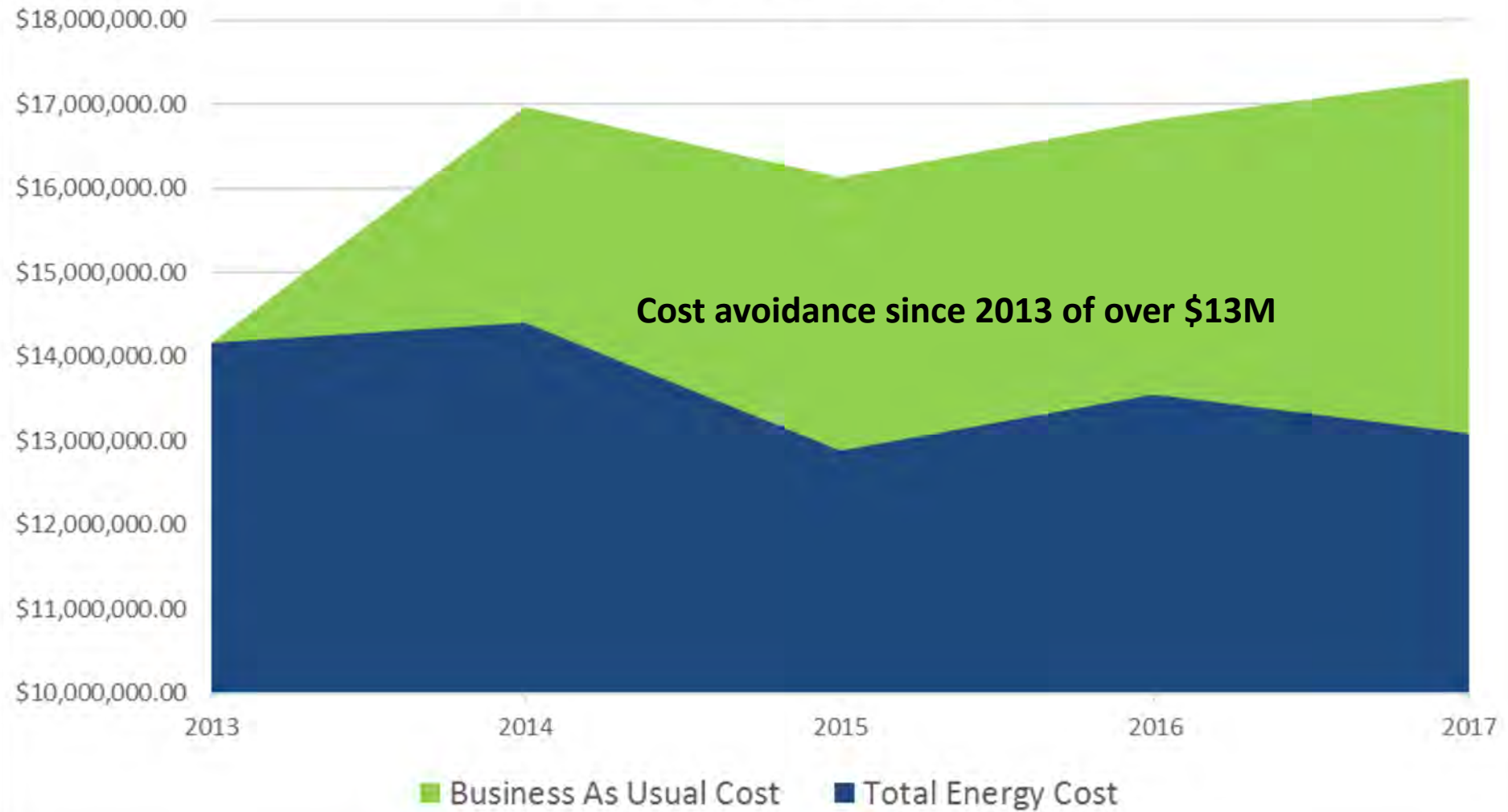


# UW Health Source EUI

**-25%**



## UW Health Energy Cost Savings





# UW Health Energy Cost

<i>Year</i>	<i>kBtu/sqft</i>	<i>\$/sqft</i>	<i>\$/MBtu</i>	<i>Square Footage</i>	<i>Total Energy Cost</i>	<i>Difference</i>	<i>Increased Costs without Improvements</i>
2013	329	\$3.58	\$10.87	3,960,024	\$ 14,159,380	\$ -	\$ -
2014	269	\$3.56	\$13.23	4,043,905	\$ 14,409,877	\$ (250,497)	\$ 2,569,822
2015	253	\$3.17	\$12.54	4,064,156	\$ 12,876,837	\$ 1,032,047	\$ 3,261,827
2016	248	\$2.93	\$11.79	4,624,444	\$ 13,548,639	\$ 1,642,788	\$ 3,276,144
2017	227	\$2.83	\$12.45	4,624,444	\$ 13,089,642	\$ 2,712,526	\$ 4,219,716
			<b>\$1.58</b>	<b>664,420</b>	<b>\$ (1,069,738)</b>	<b>Total:</b>	<b>\$ 13,327,509</b>



## Innovation Through Collaboration: Securing a More Affordable and Reliable Energy Future

PROGRESS REPORT 2018

### Challenge Partners with Greatest Energy Savings

Savings Since Baseline Year

UW Health*	<b>24%</b>
Cleveland Clinic	<b>17%</b>
NewYork-Presbyterian Hospital	<b>13%</b>
University of Maryland Medical Center	<b>12%</b>
University of Pittsburgh Medical Center (UPMC)	<b>11%</b>
University of Nebraska Medical Center (UNMC)	<b>11%</b>
Montefiore Medical Center	<b>9%</b>

\*Goal achiever



U.S. DEPARTMENT OF  
**ENERGY**

# Healthy Environments Support Healthy People



UW Health has a proud history of serving our patients, educating the next generation of care providers, advancing healthcare innovation, and improving the health of our communities. Building on our past success, we are taking environmental health to the next level in pursuit of our new vision, Remarkable Healthcare. We commit to:



## Engaged Leadership

- Make a public commitment prioritizing environmental health, safety, and social equity in an effort to help achieve the triple aim of better health, better care, and reduced cost for the communities we serve
- Embed sustainability in HR and Wellness
- Establish a partnership with UW-Madison Center for Climate Research and UW-Madison School of Medicine and Public Health to collaborate on research to make the connection between human health and the health of the environment
- Identify sustainable opportunities at all seven UW Health hospitals



## Less Waste

- Reduce the volume and toxicity of our waste to protect public health and use environmentally sound waste and disposal practices



## Smarter Purchasing

- Employ smarter purchasing strategies by looking at products that avoid chemicals of concern, improve energy and water efficiency, and optimize waste minimization strategies



## Leaner Energy & Water

- Improve energy and water efficiency across UW Health's portfolio of space to reduce greenhouse gas emissions and protect human health
- Evaluate renewable energy sources to further reduce UW Health's greenhouse gas emissions and protect public health



## Safer Chemicals

- Actively address chemicals of concern as identified by the Healthier Hospitals Initiative and look for opportunities to safely manage, eliminate, or find alternatives to protect the health of patients, staff, and the environment



## Healthy Food

- Provide access to healthy, responsible food and beverage options to improve the health of patients, staff and the communities we serve
- Reduce the amount of food we send to the local landfill

Dr. Karin Zuegg, Medical Director  
of Sustainability

Mary Evers Statz, Prog. Director  
Energy Mgt. & Sustainability

Dr. Alan Kaplan, UW Health CEO

7/17/2018

Date Signed







## Re-commitment: an additional 10%

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- In 2018 UW Health committed to a new goal calling for a total EUI improvement of 34% by 2027 over 2013's baseline. We call it 10 in 10!
- By the end of 2018, UW Health had a total improvement of 25%.

# Our Future



New ambulatory facility on the east side, 440,000SF specialty clinic

**“ONE PATIENT, ONE JOURNEY, ONE TEAM”**

**Remarkable**  
HEALTHCARE



+



Human Health and Sustainability in Environmentally Sound Buildings

# THE WELL BUILDING STANDARD™

SEVEN CONCEPTS FOR HEALTHIER BUILDINGS



AIR



WATER



NOURISHMENT



LIGHT



FITNESS



COMFORT



MIND





Committee on the Environment  
Top Ten Green Buildings Award

### The new COTE Top Ten measures of sustainable design



Measure 1  
**DESIGN FOR INTEGRATION**



Measure 6  
**DESIGN FOR ENERGY**



Measure 2  
**DESIGN FOR COMMUNITY**



Measure 7  
**DESIGN FOR WELLNESS**



Measure 3  
**DESIGN FOR ECOLOGY**



Measure 8  
**DESIGN FOR RESOURCES**



Measure 4  
**DESIGN FOR WATER**



Measure 9  
**DESIGN FOR CHANGE**



Measure 5  
**DESIGN FOR ECONOMY**



Measure 10  
**DESIGN FOR DISCOVERY**

# Lessons Learned

- Win awards-3<sup>rd</sup> party validation of your efforts
- Connect to what leadership is trying to do
  - Save money
  - Engage employees-reduce turnover
  - Improve population health
  - Quadruple aim of healthcare
  - Patient satisfaction
- Get your message out-newsletters, web pages, public speaking
- Don't just talk, write a plan, or two! Give senior leaders something to react to
- The Rule of Seven

Amanda Holloway  
Director Office of  
Sustainability  
Mayo Clinic

Brett Gorden  
Section Head Facilities  
Management  
Mayo Clinic











- In 2011, Mayo Clinic leadership committed to reducing the energy use of the Rochester campus by 20 percent by 2020 from a 2010 baseline. The Facilities Operations team, IT staff, and Facilities Project Services team developed and implemented a plan around energy saving strategies that focused on operating and maintaining buildings more efficiently, as well as designing and constructing energy-efficient spaces.
- Achieving their goal early enabled Mayo Clinic to commit to an additional goal of 10 percent energy reduction by 2025. The success of their energy savings at the Rochester campus has led to the continued support from leadership to implement energy saving projects and an organization-wide energy policy.

## ANNUAL ENERGY COST

Baseline (2010)



\$33.4 million

Actual (2017)



\$29.4 million

COST SAVINGS:

**\$4 million**

## ANNUAL ENERGY USE

Baseline (2010)



308 kBtu/sf

Actual (2017)



244 kBtu/sf

ENERGY SAVINGS:

**20%**

# Mayo Clinic

## Rochester, MN

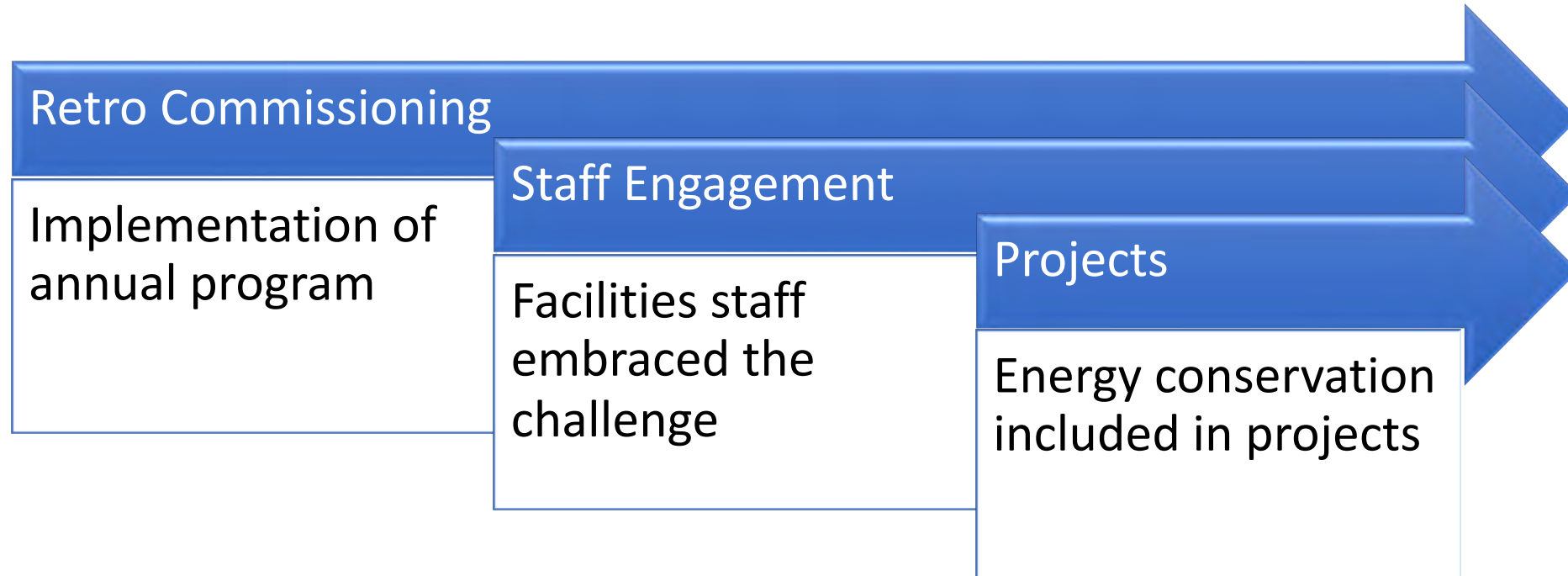
- 3 Campuses plus outbuildings
  - Mayo Clinic
  - Mayo Clinic Hospital, Saint Marys (1,265 beds)
  - Mayo Clinic Hospital, Methodist (794 beds)
- Integrated medical center providing comprehensive diagnosis & treatment in virtually every medical and surgical specialty
- 35,000+ employees
- 21 million square feet
- 127 operating rooms



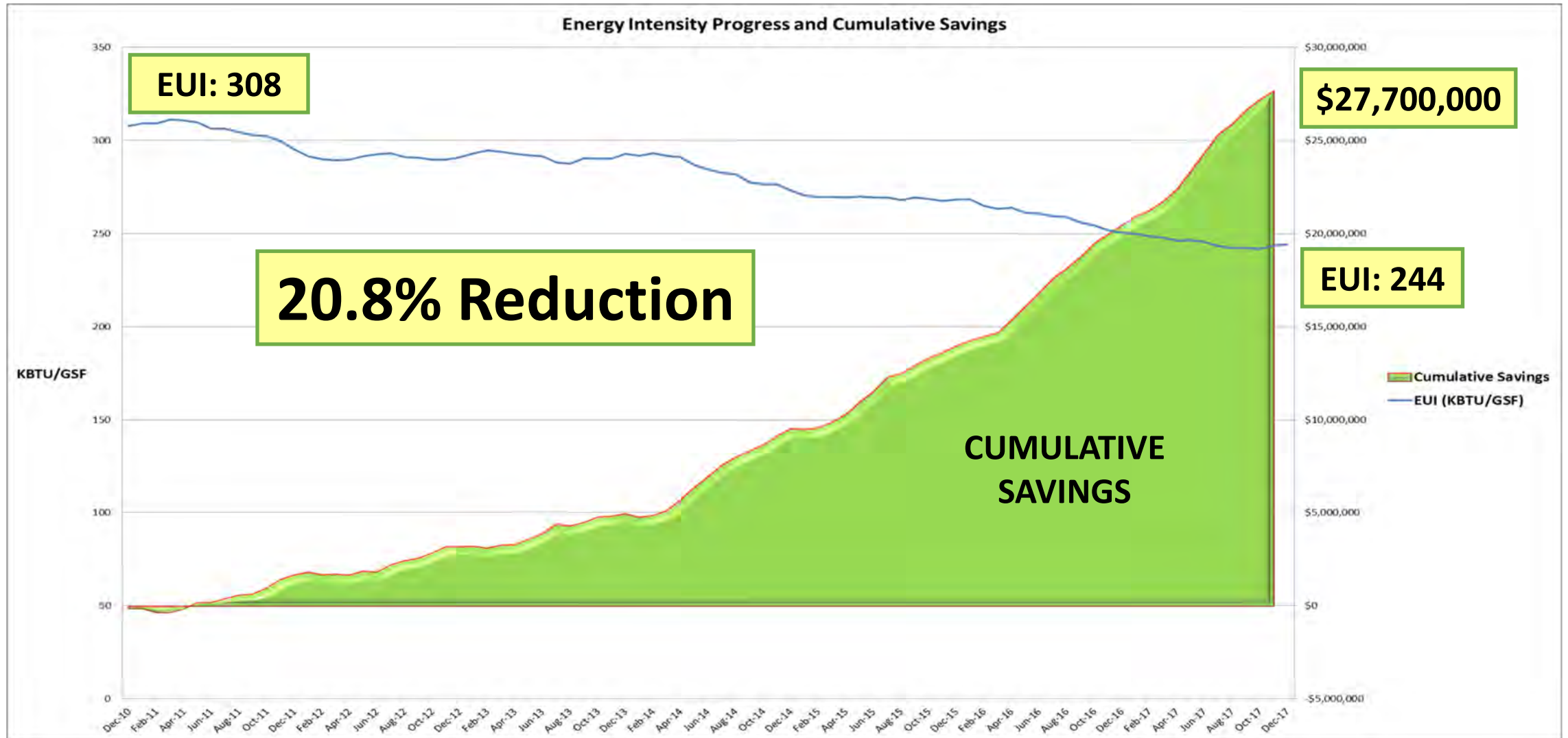


# Energy Conservation Goal

- Green Committee creates conservation goal in 2011
  - Reduce Energy Use Intensity (EUI) by 20% by 2020 (baseline 2010)
  - Made energy a priority



# Savings Through 2017



# Retro commissioning Plan

- Review original design
- Walk-through of building and systems
- Review Energy Consumption Data
- Meetings with Facilities Operations Staff
- Review Control Sequences
- Field testing

## Small buildings

- < 200,000 sq. ft.
- KBTU/s.f. < 200
- Facilities Ops led
- Consultant Supported

## Large Buildings

- > 200,000 sq. ft.
- KBTU/s.f. > 200
- Consultant led
- Fac Ops supported



# Retro Commissioning Plan

- 28 Buildings Complete Since 2011
- 7+ million square feet
- Over 600 Energy Conservation Opportunities Identified
- Siebens, Hilton/Guggenheim, Stabile, Harwick, Baldwin, Mayo Support Center
  - Averaged over 25% reduction in EUI after RetroCx



# Engagement of Facilities Staff

- Maintenance staff crucial to the performance of the building systems
- Knowledge of the buildings and systems
- 2020 goal empowered staff to find and correct inefficiencies:
  - Scheduling HVAC equipment
  - Variable Frequency Drives
  - Lighting retrofits and lighting controls
  - Building Automation Programming
  - Duct Sealing



# Engagement of Facilities Staff

New flow controls and variable frequency drives were installed in Mayo, Gonda, Plummer and Stabile buildings on the domestic water pumps.

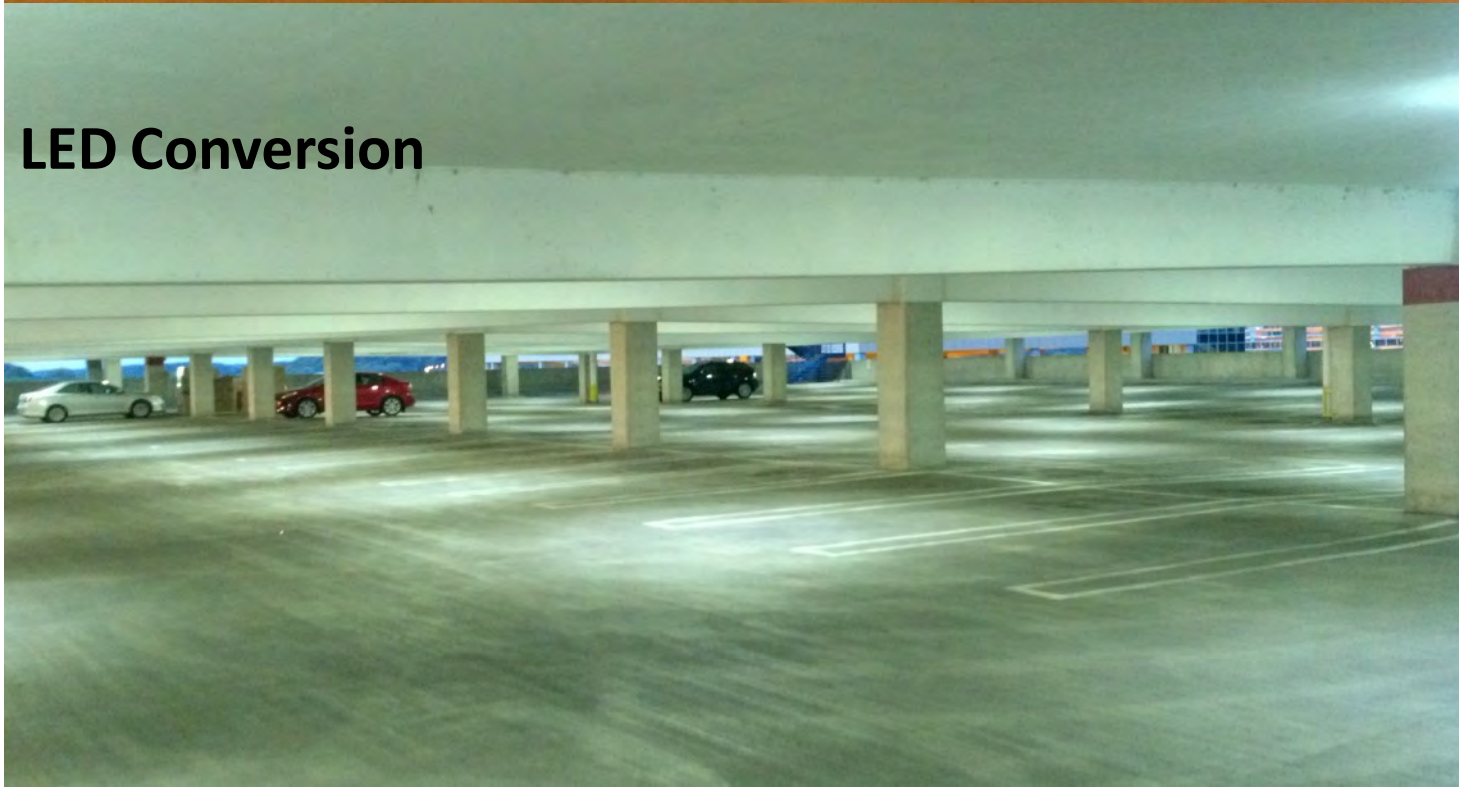
**Savings / year = \$45,000**







**High Pressure Sodium lights.**



**LED Conversion**

## **LED LIGHT CONVERSIONS**

West Employee Parking Ramp  
Completed: May 2015

### **BENEFITS**

- Increased light levels
- Safer environment
- Reduced energy use
- 480,000 KWH/YR



**Dust from air leaks**

## **FACILITIES DUCT SEALING PROGRAM**

**Duct sealing reduces  
leakage by 95%**



# Duct Sealing Equipment

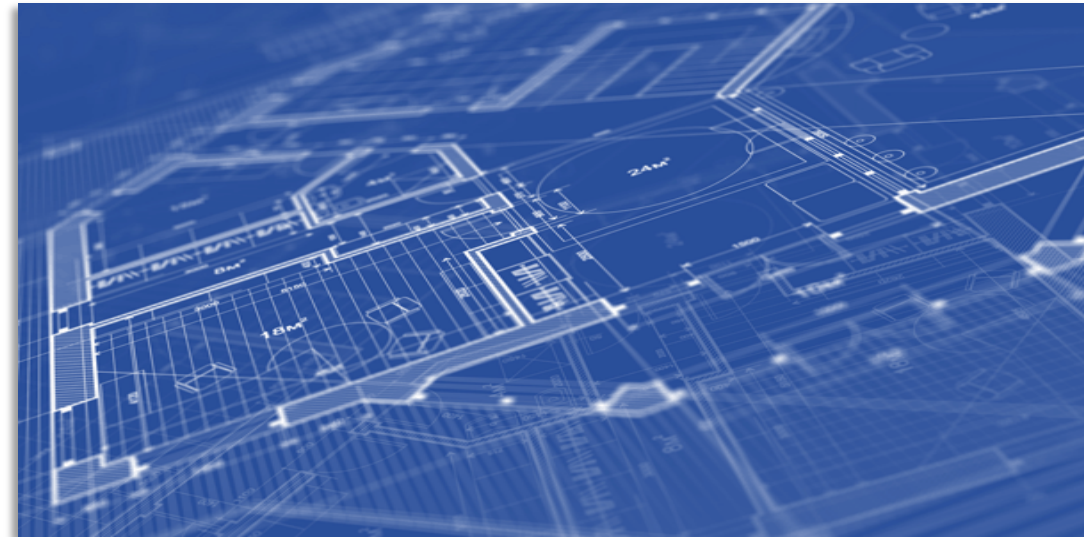


**Annual savings of  
\$505,200!**

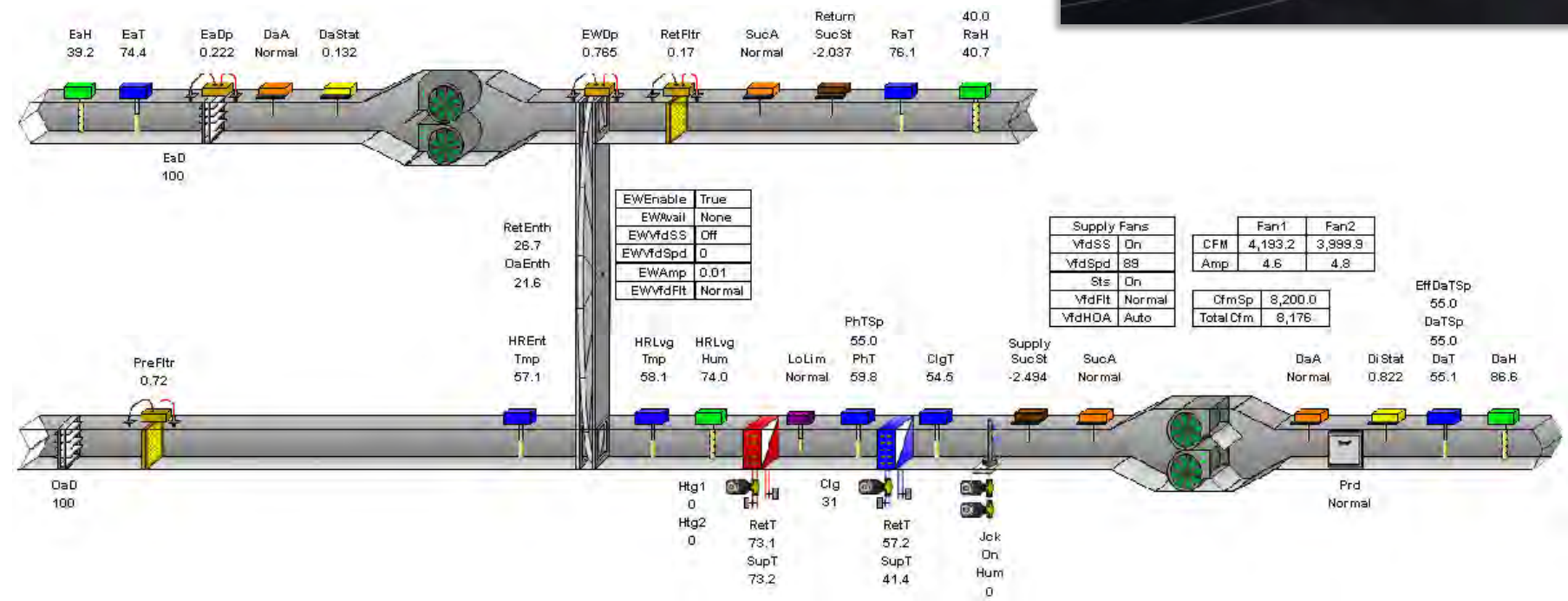


# Energy Efficiency in Design

- Efficient Lighting
- Replacing pneumatic controls with new digital building automation systems
- Efficient HVAC equipment and system design
- Setting energy goals for new buildings & additions



# Jacobson Energy Recovery Wheel



# Medical Science

New energy efficient exhaust system

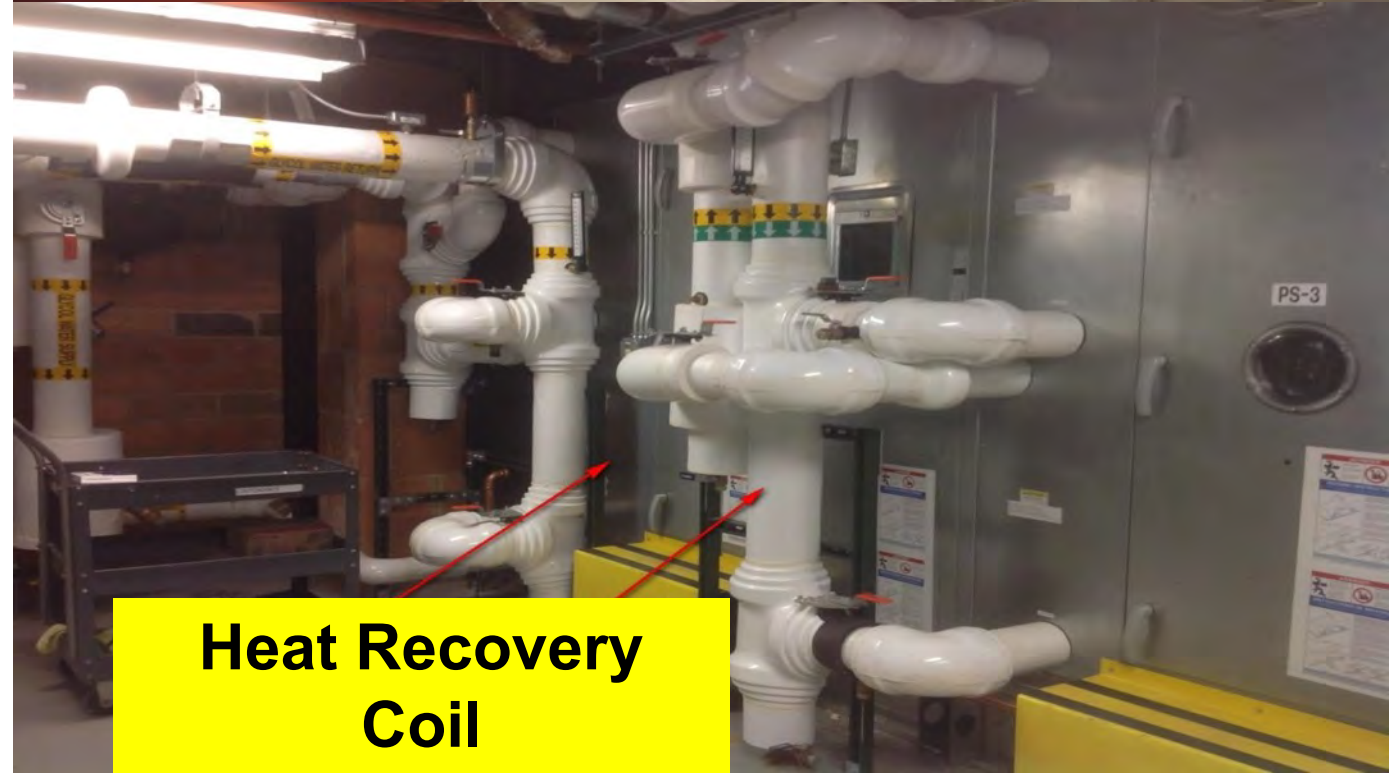
New heat recovery system

Annual savings estimated at  
\$70,000



New AHU

Exhaust Plenum



Heat Recovery  
Coil



# Re-commitment to an additional 10%

- Leadership support – bolder, faster
- Energy Policy
- Energy Management Guidelines
- Real-time Energy Monitoring and dashboards
- Sustainable Buildings Policy (almost complete)
- Green Advocate Program

**New Goal: 30% by 2025 (baseline 2010)**

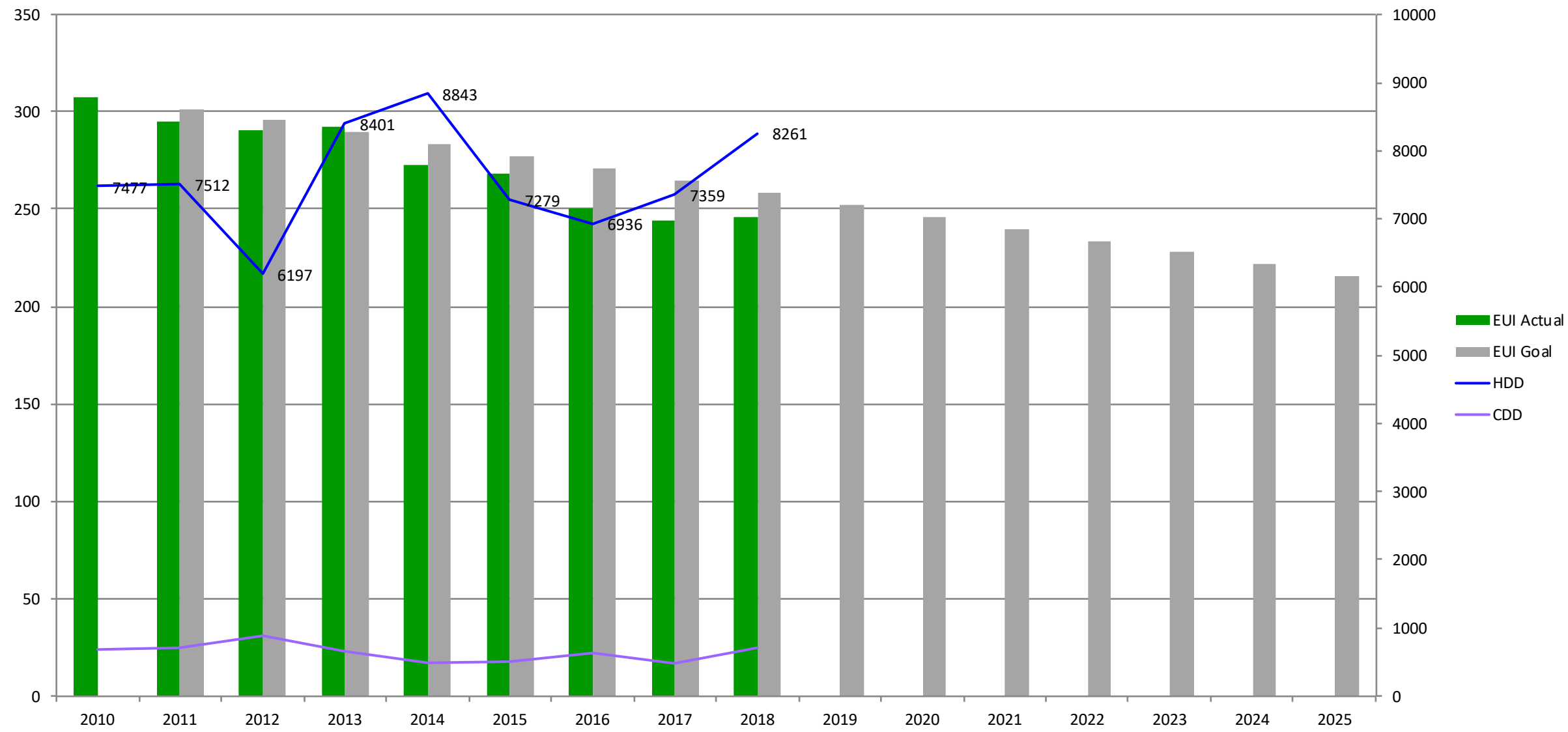
# Engaging Employees

## Green Advocate Program

- Help others develop eco-friendly habits
- Promote program activities in work unit
- Communicate messages to colleagues
- Attend meetings and special events
- Share ideas, successes, challenges with other Green Advocates
- Set an example by practicing sustainability



# Rochester Annual EUI Trend





# Updated Energy and Health Impact Calculator

- Update coming in late fall
- Will include thermal energy in addition to electricity
- Templates to present your results

# Example: Energy and Health Impact Calculator

Total					
	Incidents Per Y...	Total Incident ...	Direct Medical ...	Pain and Suffe...	Lost Wages
Premature Death	9.8	\$92,600,478	●	●	●
Hospital Admissions	3.9	\$145,733	●	○	●
Asthma Exacerbation	166.9	\$10,736	●	●	○
Respiratory Symptoms	284.5	\$13,424	●	●	○
Non-fatal Heart Attacks	3.8	\$524,012	\$422,270	○	\$101,742
ER Visits (Asthma)	3.1	\$1,487	\$1,487	○	○
Work Loss and Restricted Days	5,181.9	\$470,653	○	○	\$470,653
Mercury Related	-	\$11,155	●	●	●
Social Cost of Carbon	-	\$2,489,590	●	●	●
Total	5,653.9	\$96,267,267	\$423,757	-	\$572,394

Based on an estimated avoided 63,075,895 kWh electricity from the UW Health system

# Question & Answer



# Contact Information

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HEALTHY  
PLANET

HEALTHY  
PEOPLE