

Midwest Healthcare Engineering Conference

ASHRAE Standard 189.3-2017: Sustainability Defined for Healthcare

November 30, 2017

Speakers



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Health



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World Wide



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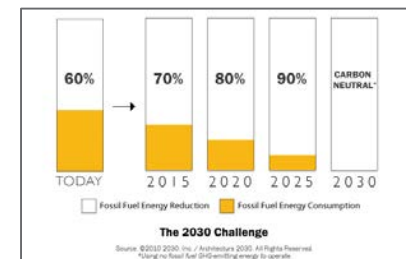
IUH Adopts ASHRAE 189.3



- Quote from IUH on why IUH is adopting this standard

IU Health Direction

- Fulfill social and fiscal corporate responsible
- Sustainability is a patients and staff top concerns
- Reduce IU Health's Carbon Footprint
- Opportunity to move toward self-reliance
- IU Health is aligning with Indiana University who is a leader in sustainable design and construction



Proposed IU Health Sustainable Construct

- 1) *Campus Environments* – facilities design, construction and maintenance;
- 2) *Administration & Oversight* – corporate goals, policy and measurement, and;
- 3) *Personal Subsistence* – IU Health staff education, personal involvement and celebrations around *achievement and results*.



- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality
- Innovation & Design Process



IU Health Campus Environments

- **Aim:** Facility and site performance standards for all IU Health projects including *LEED*, *ASHREA 189.3*, *EnergyStar* to assure IU Health Facilities meet the standard throughout the system
- **Course:** Provide a process roadmap for ensuring sustainability is addressed at key points during the planning, design, construction, activation and facility maintenance phases of our buildings.
- **Opportunity:** Provide a manual of best practices and guidance for project teams to consider including benefit analysis, ROI, life-cycle analysis of systems and processes to move IU Health toward carbon neutral and self-reliance.



Environmental Impact of Healthcare Facilities



- 23% of global deaths and 26% of deaths among children under five are due to modifiable environmental factors.



Environmental Impact of Healthcare Facilities



- Healthcare spending in the United States in 2015:
 - \$9,900 per person, up 5.8% from 2014
 - \$3.2 trillion, 17.8% of GDP
 - More than any other country



Environmental Impact of Healthcare Facilities



- Hospitals are the 2nd most energy-intensive commercial buildings in the country, after food service (EIA)
- The healthcare sector produces 8% of the country's total carbon-dioxide output (University of Chicago)
- Hospitals in the US produce more than 4.7 million tons of waster per year (Practice Greenhealth)
- In the US, medical waste produces over 3.5 million tons of waste per year, average disposal rate is \$790 per ton.

Indiana University Health Statewide Presence



- **15** hospitals plus health centers, partners, affiliates & joint venture operations
- **3,098** staffed beds
- More than **29,000** full-time team members
- More than **2.7 million** admissions and outpatient visits
- More than **1,400** research studies



IU Health Highlights



In partnership

IU School of Medicine

the nation's largest medical school and a national leader in medical education and research

IU Health Transplant

is one of the nation's largest transplant programs

1,200+

IU HEALTH PHYSICIANS teach medical students and/or medical residents



Ten clinical programs ranked among the **top 50 national programs** in *U.S. News & World Report's* 2015-16 edition of America's Best Hospitals



Riley Hospital for Children
Indiana University Health

NATIONALLY RANKED IN **10** OUT OF **10** PEDIATRIC SPECIALTIES



Seven IU Health hospitals have achieved Magnet status—the gold standard for nursing excellence

IU Health Mission

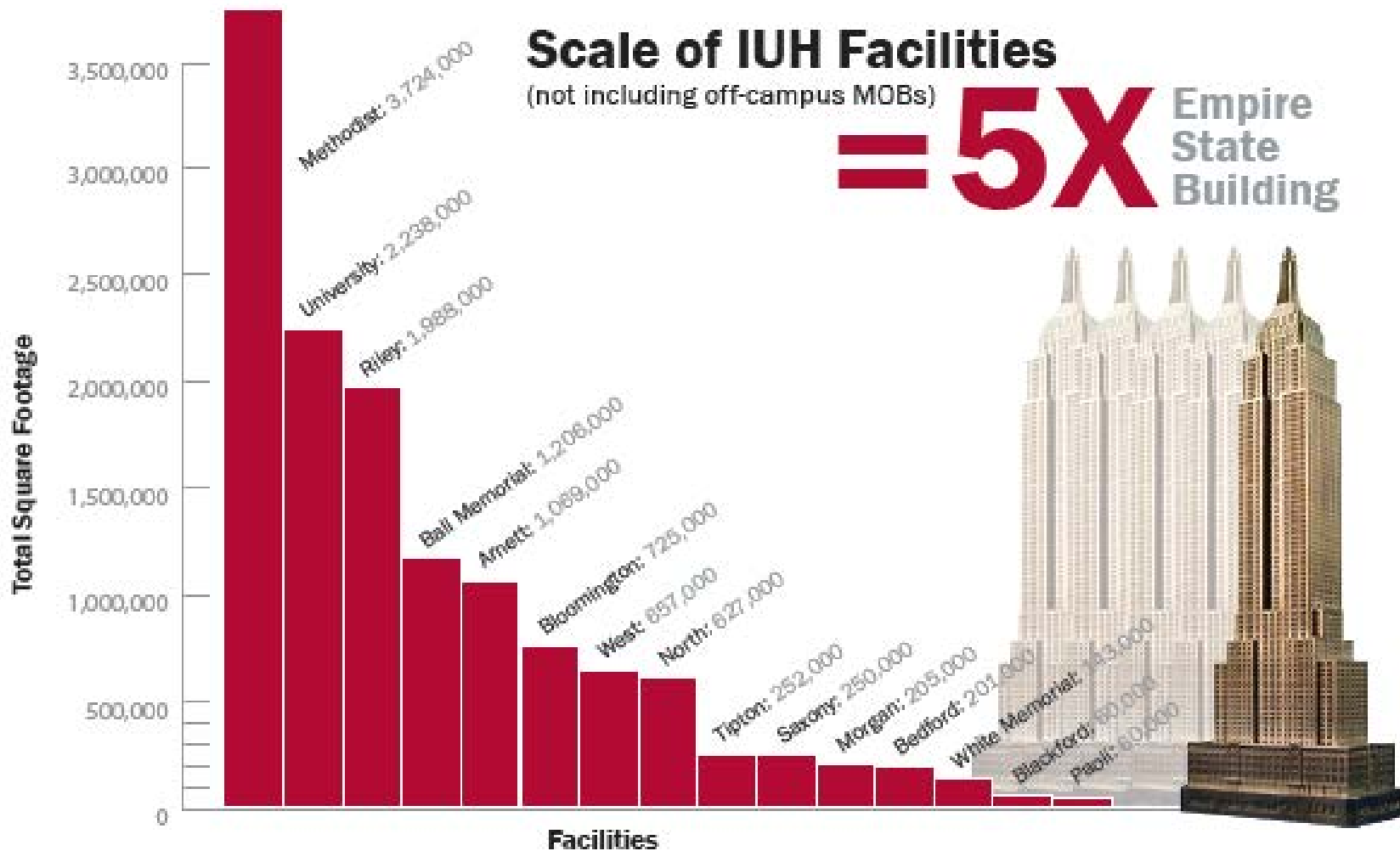


To *improve* the **health** of our *patients* and *community*
through *innovation*, and *excellence* in **care**, education,
research and **service**.



Indiana University Health

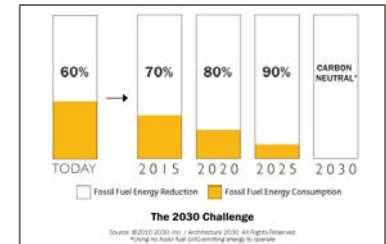
IU Health Facilities



IU Health Sustainability



- Educate patients and staff on Sustainability
- Reduce carbon footprint
- Align with Indiana University to achieve LEED Gold
- Apply lean design methodology



IU Health Sustainability Direction



1

Campus Environments – facilities design, construction and maintenance



2

Administration & Oversight – corporate goals, policy and measurement



3

Team Engagement– IU Health team education, personal involvement and celebrations around *achievement and results*



New Adult Hospital, Downtown Indianapolis



Existing site area

- *5.7 million sq. ft.*

Existing beds: 1,428

- *Methodist 750*
- *University 387*

Building ages

- *10 to 100 years*

Investment plans:

- *\$900M*

IU Health RAHC - Bloomington



Total site area

- *70 acres*

Design phase

- *Schematic Design / Design Development*

Investment plans

- *\$340M*



Overview of ASHRAE Standard 189



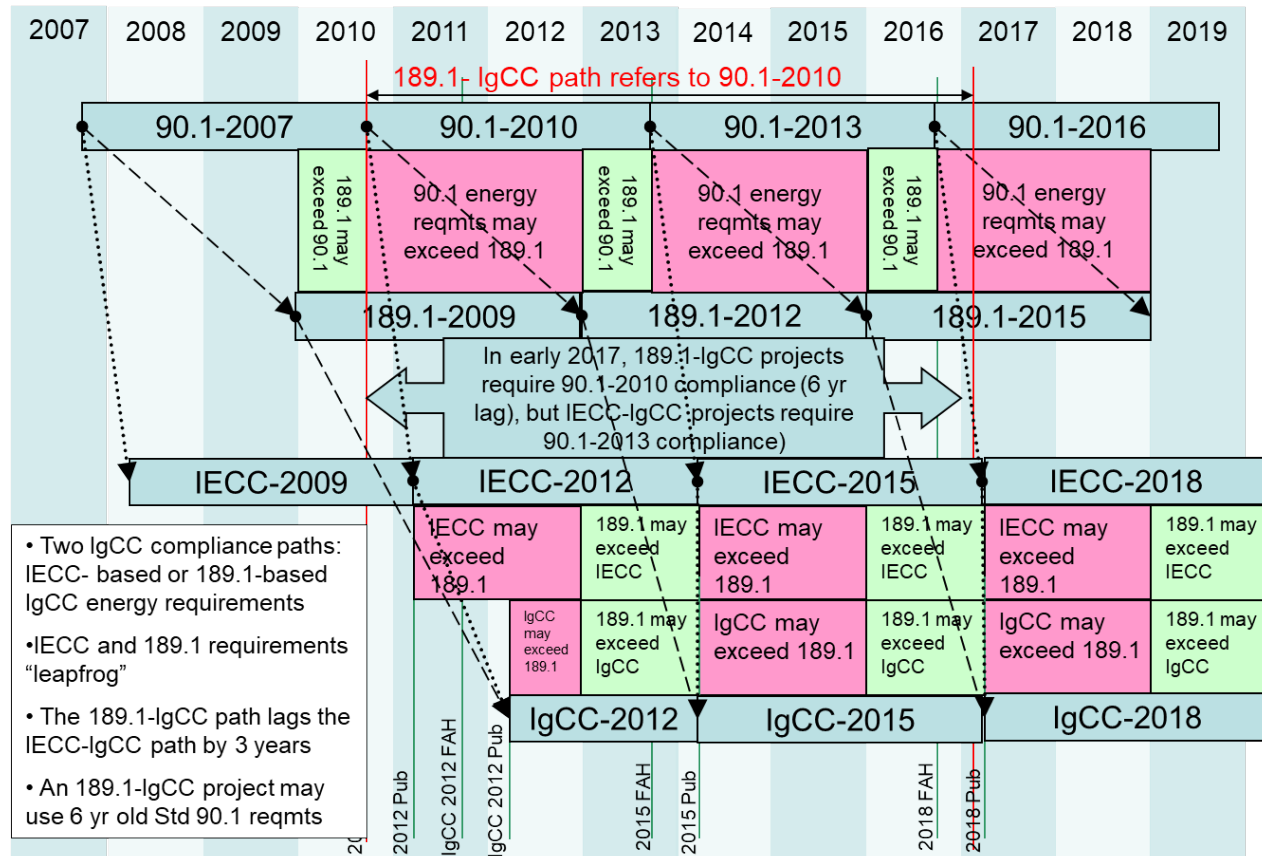
- ASHRAE, in conjunction with the U.S. Green Building Council and the Illumination Engineers Society, has developed a standard for High Performance, Green Buildings (Standard 189.1-2014). The Standard provides the minimum requirements for a high-performance green building, and was developed with the intent to provide a balance of environmental factors involved with designing, building, and planning for the operation of buildings.
- Original Release 189.1-2009 in January 2010
 - 3 ½ years of development, 4 round public review
 - Cosponsors USGBC and IES
 - ANSI Standard
- Updated 2011 and 2014



Current Status of Standard 189



- 2018 Version of 189.1 will be the engine of the IGCC



ASHRAE 189.3 - Site



- All requirements as now mandatory
 - Allowable site, where to build or where not to allow a building.
 - Other area that are not addressed
 - Urban heat island
 - Light pollution limitations
 - Stormwater management
 - Transportation Impacts
 - Protection of natural and native site features

ASHRAE 189.3 - Water



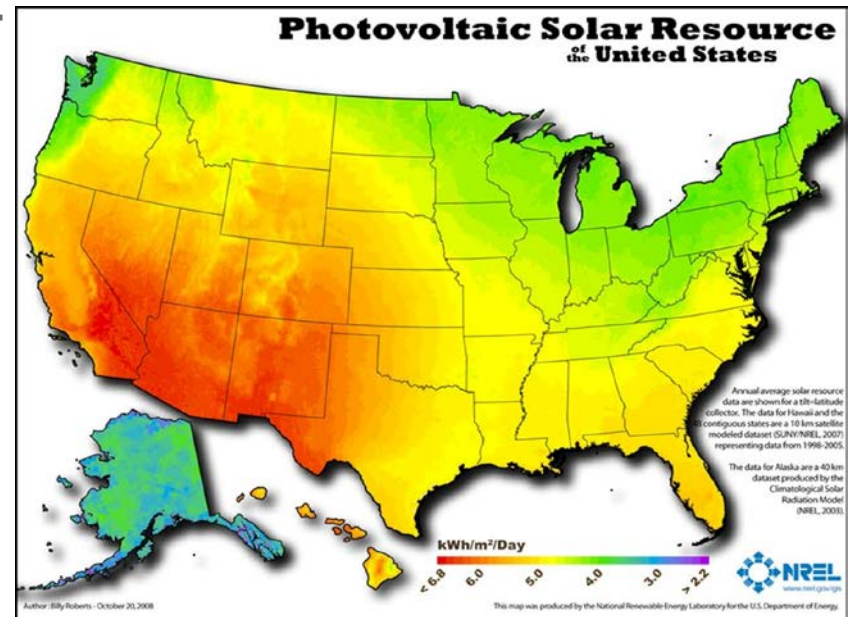
- Mandatory
 - Building Water Use
 - Cooling Tower Makeup
 - Drift Eliminators
 - Condensate Collection
 - Backup Systems



ASHRAE 189.3 - Energy



- Significant update for the publication of 90.1-2013
- Updated carbon dioxide emission factors for different energy sources
- On site renewable power



ASHRAE 189.3 - Energy



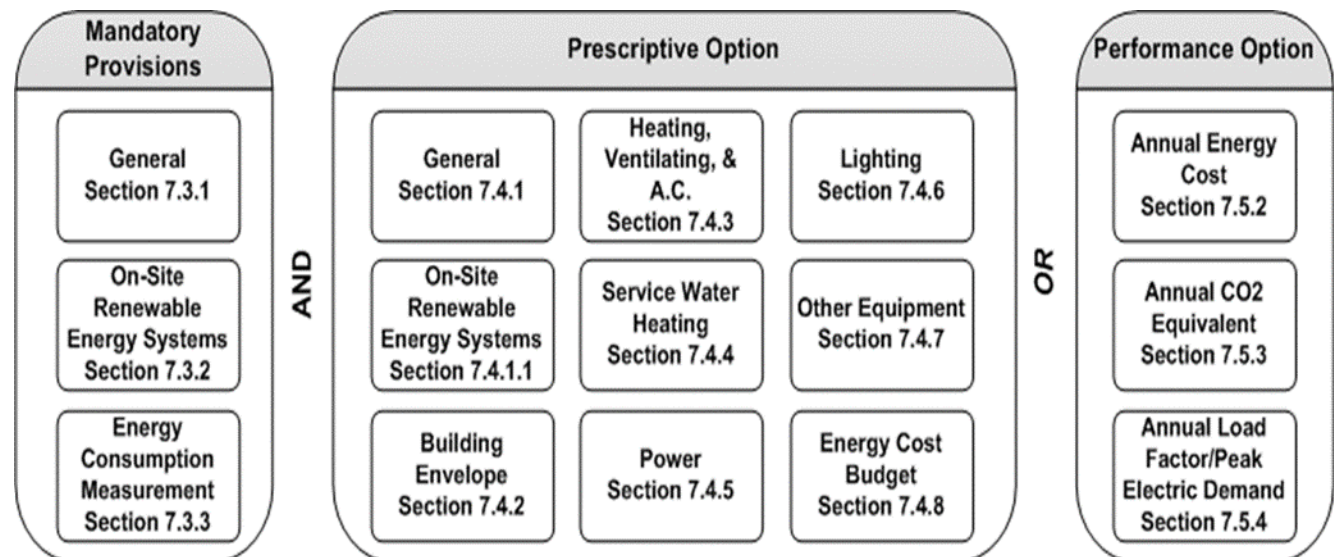
- Energy Monitoring
- Data Storage
- Fan Efficiency
- Energy recovery Efficiency
- Power and Peak Load
- Lighting Power Allowance



ASHRAE 189.3 - Energy



- Energy Performance Option
 - Annual Energy Cost
 - Deleted Comparison of peak demand
 - Documentation of CO₂





- Outdoor Air Flow
- Tobacco Smoke Control
- Outdoor Air Monitoring
- Filtration and air cleaning
- Daylighting
- Thermal Comfort
- FGI Acoustics
- Furniture System Testing

ASHRAE 189.3 - Materials



- Construction Waste Management
- Reduced Impact Materials
 - Recycled or Salvaged
 - Regional
 - BioBased
- Life Cycle Assessment
- Storage of Recyclables

ASHRAE 189.3 - Operation



- Construction and Plans for Operation
 - Commissioning
 - Hazard Chemical Management
- Emissions and Pollution Control
 - Hazard Chemical Management
 - Pharmacy
 - Soil and Water
 - Medical, Radiological Waste

IUH RAHC Bloomington



update image

IUH RAHC Bloomington



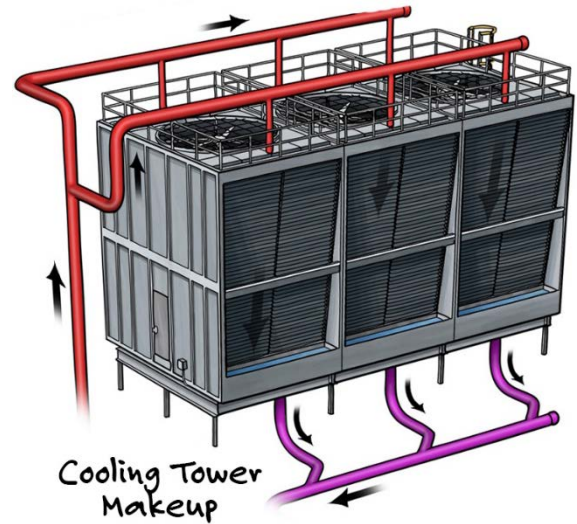
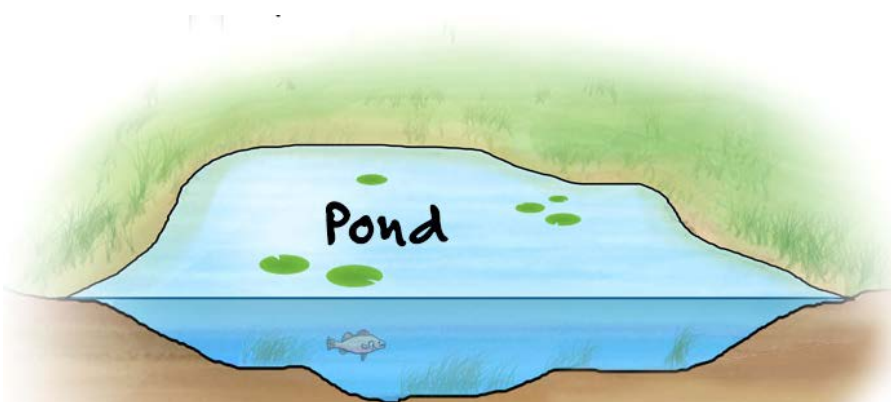
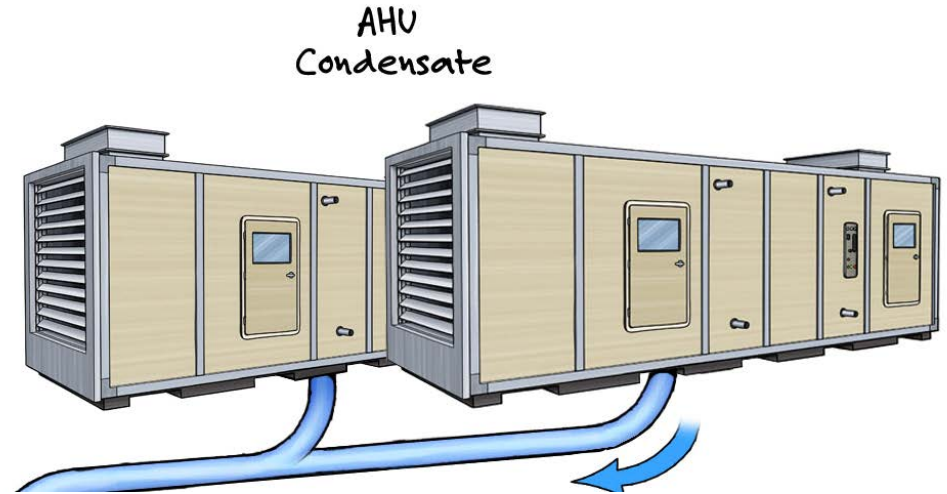
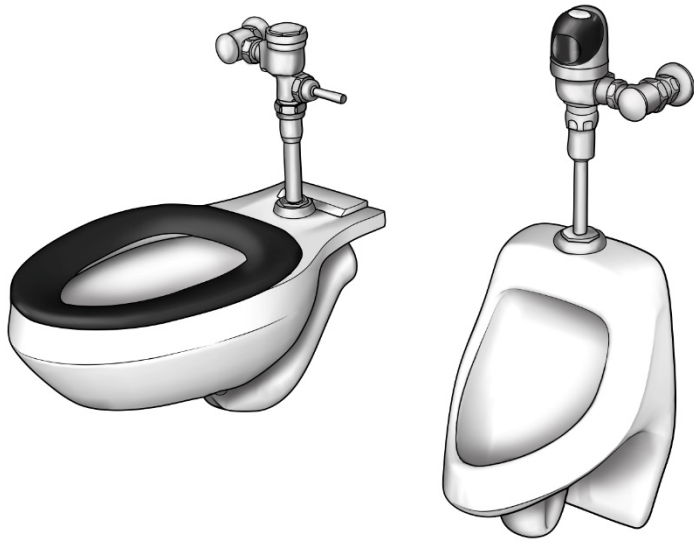
- Project Area: 700,000 GSF
 - Inpatient:
 - Ambulatory:
 - Clinic:
 - CEP:
 - Academic: (IU not following 189.3)
- Goals:
 - ASHRAE 189.3-2017 compliance
 - LEED 2009 for Healthcare – Silver
 - EnergyStar – 75

189.3 Impacts:



- Min 50% of hardscape has SRI>29
- Equipment coordination (medical, laboratory, and food service)
- Building walk-off mats (minor, but easily overlooked)
- Bio-Based products
- Low emitting materials

189.3 Impacts: Water



189.3 Impacts: Renewables



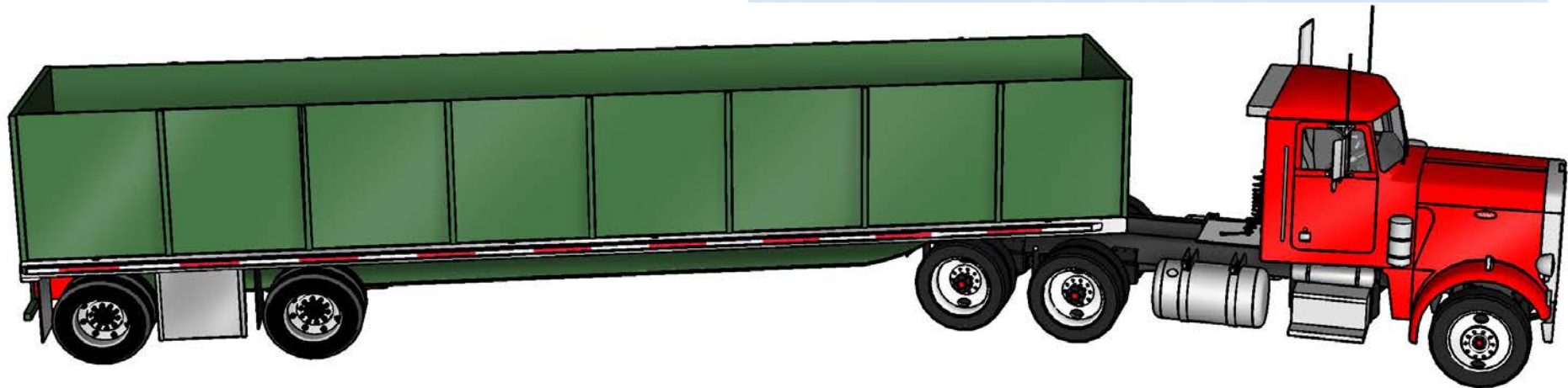
- Renewable Infrastructure
- 175,000 SF of roof
- ~40,000 SF of array footprint to produce 10 kBtu/SF-roof/yr

189.3 Impacts: Renewables

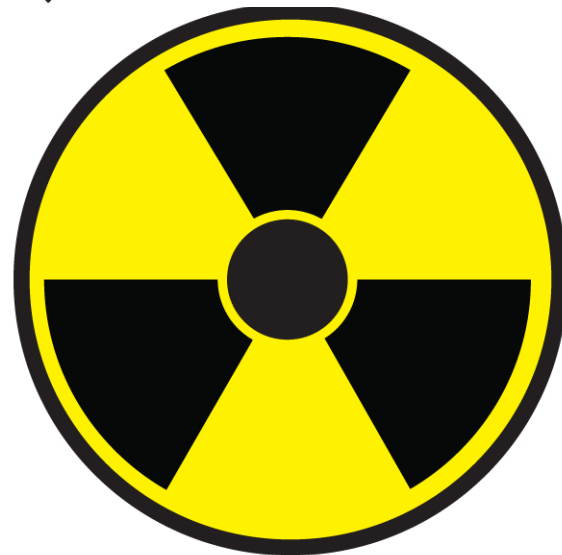


ASHRAE 189.3 Solar Infrastructure: Footprint to Achieve 10 kBtu/ft²-roof-year				
Location	Optimal Angle (ft²)	5 Deg Angle (ft²)	25 Deg Angle (ft²)	
Indianapolis				
Seattle				
San Francisco				
Los Angeles				
Denver	Update Table			
Minneapolis				
Houston				
New York City				
Washington D.C.				
Atlanta				
Miami				

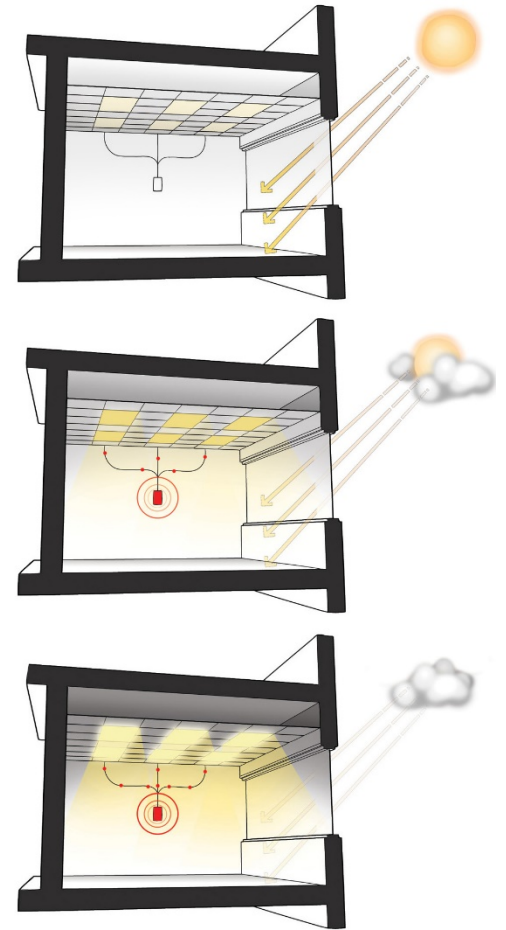
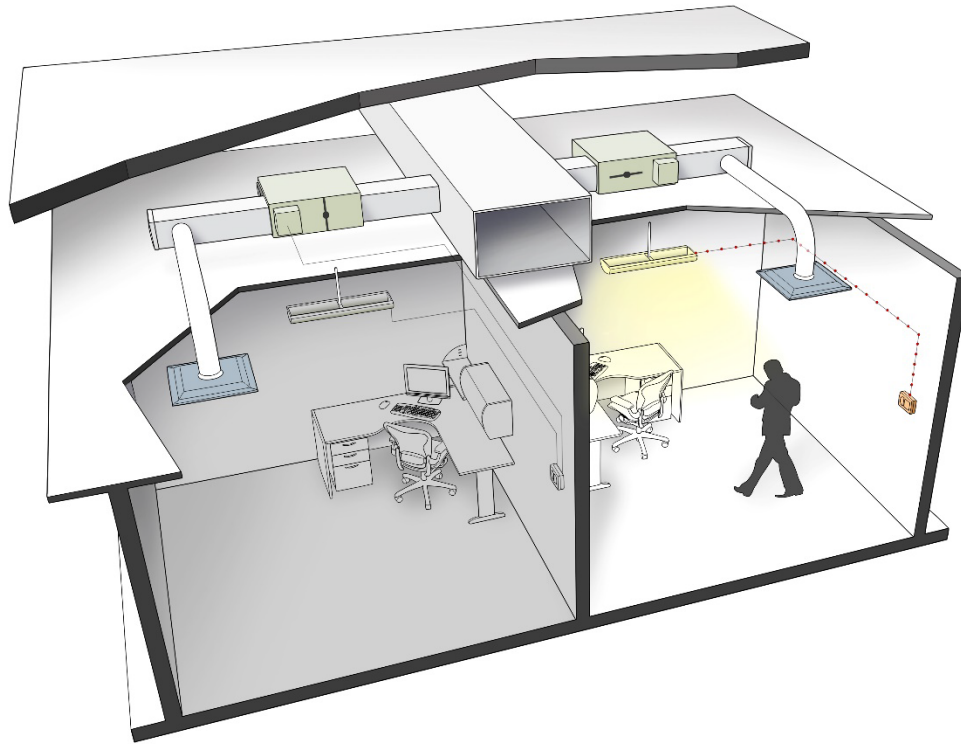
189.3 Impacts: Acoustics



189.3 Impacts: Operations



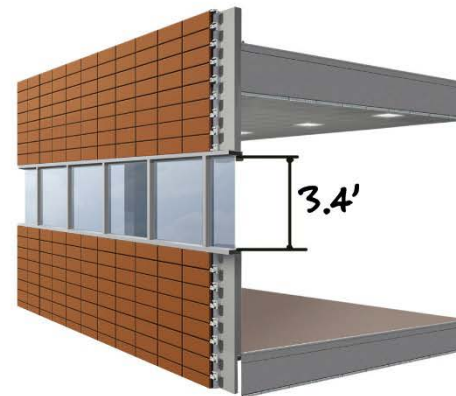
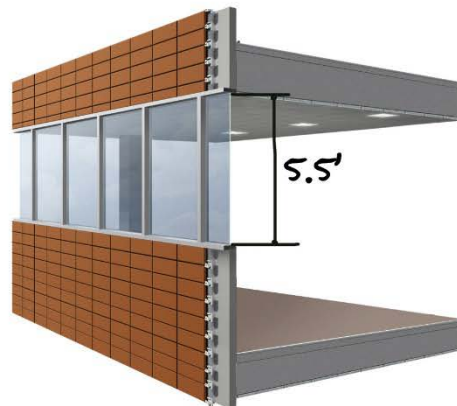
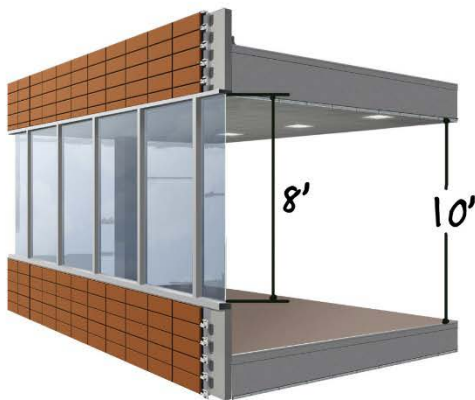
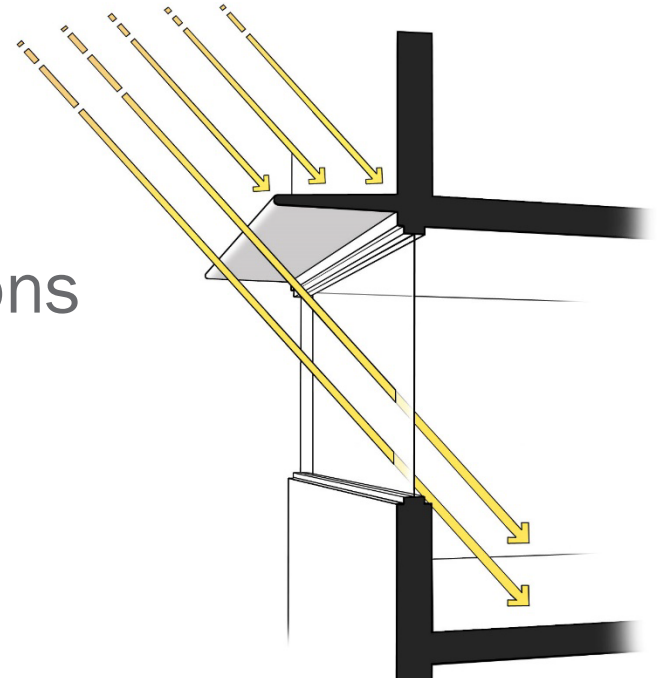
189.3 Impacts: Lighting & Daylighting



189.3 Impacts: Energy Modeling



- Prescriptive requirements:
 - Exterior shading
 - Window-to-wall ratio limitations



Bloomington 189.3 Impacts, cont.

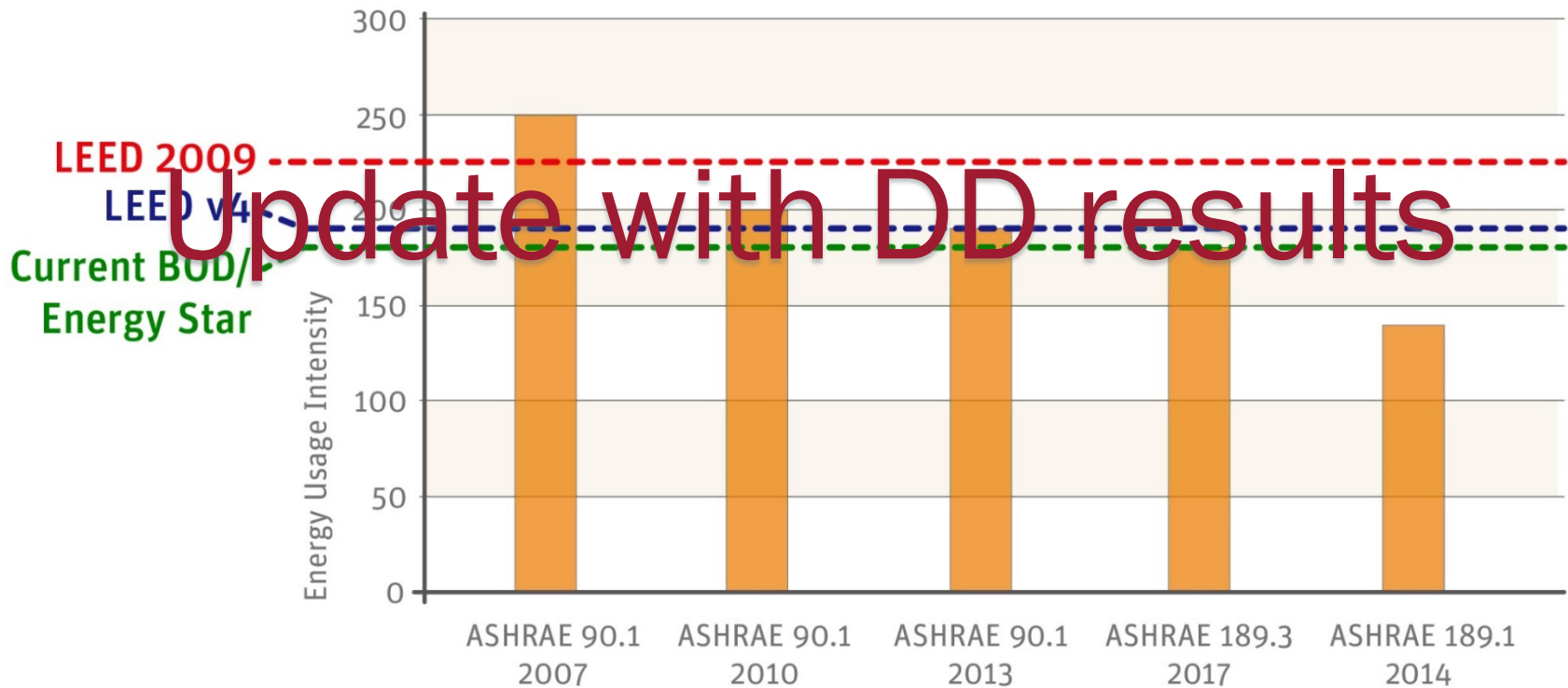


- High performance envelope / glazing
- Efficient equipment (lab, medical, food, office)
- LED lighting and broad adoption controls
- Active chilled beams in some non-inpatient areas
- Air-side heat recovery
- Heat recovery chillers
- Condensing boilers
- Variable speed chiller plant

Bloomington 189.3 Impacts, cont



Approximate Estimate of EUI vs. Standards and Guidelines



Conclusion



- ASHRAE 189.3 is a comprehensive collection of best practices and requires everyone involved with the project to understand and implement requirements.



Thank You



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