Conventional Systems, Unconventional Results

Jeff Williams
Major Health Partners
Douglas R. Hundley
CMTA
About CMTA

- Founded in 1968
- Top 50 MEP firm in U.S.
- Over 200 Employees in seven offices
- 77 Licensed Professional Engineers
- 72 LEED APs
- 1 WELL AP
- 153 ENERGY STAR projects
- 54 LEED projects
Now CMTA Has...

- Health care projects in over 30 states and Canada
- Multiple Indiana projects
- Multiple long-term clients
About Major Health Partners

• Founded in 1924
• Beginning in 1960 the facility underwent several renovations
• Currently 51 inpatient beds
• Full range of acute care services
• Patients come from southeastern Indiana
About the New MHP Medical Center

- 305,000 square feet
- 55 inpatient beds
- 38 outpatient rooms in new Ambulatory Care Center
- 4 ORs and 1 C-section suite
- Medical offices on the second floor

BSA Lifestructures
Design Team Selection Process

• Executive architect
• Architect and Engineers selected separately
• “Dream Team”
• MHP held the contracts to reduce filters
Project Benchmarking

“In God we trust, all others bring data.”
“You cannot manage what you do not measure.”

W. Edwards Deming, Ph.D.
Energy Efficiency in Health Care

- Health care has been slower than other sectors to adopt energy efficient practices
- Targeting 100, ASHE, ACHE, Premier and other organizations are now focusing on reducing energy use
- ASHRAE AEDG 50% Reduction for Hospitals
What is EUI?

- EUI is expressed as energy per square foot per year. It’s calculated by dividing the total energy consumed by the building in one year (measured in kBtu) by the total gross floor area of the building.
Regional Large Hospital EUI

- Midwest/Northeast Average 266 EUI
- New Major Hospital 125 EUI

Midwest Healthcare Engineering Conference & Trade Show  
#MWHCEC16
Architect

- Improved building envelope
  - Roof
  - Walls
  - Windows
  - Building pressure test

- Orientation
MEP Engineer

- HVAC
- Chilled Water
- Water Heating
- Lighting
- Controls
- Kitchen
What does this mean for MHP Medical Center?
High Performance Systems
Steam/Hot Water (Conventional)

• Minimize steam boiler size
• High efficiency condensing boiler for building heat and domestic hot water
• Small steam boiler for CSR and humidification
High Performance Systems
Chilled Water Generation (Conventional)

• Variable speed chillers
• Primary pump, variable flow chilled water distribution with automatic coil control valves
• Heat recovery
High Performance Systems
Air Handling Units/VAV (Conventional)

• Reduced system maintenance
  – Standardized filter sizes
  – Direct Drive Fans
  – UV Lights
High Performance Systems
OA Units (Unconventional)

• Energy recovery – minimum outside air
• Multiple smaller fans
  – Improved fan efficiency
  – Improved fan power
  – Improved system redundancy
MEP Systems (Unconventional)

- Heat recovery for minimum outside air
- Heat pump chiller
- Hot water production during the summer
- Water source heat pump with dedicated outdoor air unit MOB
- 100% power backup
High Performance Systems
Lighting (Conventional)

- Reduce lighting energy intensity (w/sf)
- Lighting control system
  - Night corridor dimming
  - Exterior façade lighting
  - Natural lighting
LED Lighting

• MHP Medical Center is 100% LED lighting
• 0.51W/sf.
• 58% better than code (1.2W/sf for hospital).
Why is energy efficiency important?

- Health care is the second most energy-intensive building sector in the United States, according to the DOE.
- Every $1 a not-for-profit health care organization saves in energy is equivalent to generating $20 in new revenues.
# ENERGY STAR Target Finder

## Major Hospital

<table>
<thead>
<tr>
<th></th>
<th>Project</th>
<th>Median</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGY STAR Score</td>
<td>&gt;95</td>
<td>50</td>
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<tr>
<td>EUI</td>
<td>125</td>
<td>266</td>
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<tr>
<td>Energy Costs</td>
<td>$409,200</td>
<td>$675,000</td>
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<tr>
<td><strong>Annual Savings</strong></td>
<td></td>
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<td>$266,000</td>
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Commercial Buildings Energy Consumption Survey (CBECS) Data
**ENERGY TRACKING FORM**

**PROJECT INFORMATION:**

- **Project Name:** MHP - Major Hospital
- **Facility GSF:** 345,300 sqft
- **Monitoring Start Date:** 2/1/2017

**UTILITY BILL INPUT:**

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Cost ($)</th>
<th>Electrical Usage (kWh)</th>
<th>Gas Usage (ccf)</th>
<th>Electrical Energy (kBtu)</th>
<th>Gas Energy (kBtu)</th>
<th>Total Energy (kBtu)</th>
<th>Actual (kBtu/sf)</th>
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<td>Feb-17</td>
<td>58,242</td>
<td>446,713</td>
<td>22,297</td>
<td>1,524,185</td>
<td>2,294,361</td>
<td>3,818,546</td>
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<tr>
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<td>58,579</td>
<td>550,580</td>
<td>21,818</td>
<td>1,978,579</td>
<td>2,245,072</td>
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<td>625,850</td>
<td>19,315</td>
<td>2,135,400</td>
<td>1,987,514</td>
<td>4,122,914</td>
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<td>54,078</td>
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<td>6,602</td>
<td>2,371,163</td>
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<td><strong>Totals</strong></td>
<td><strong>282,589</strong></td>
<td><strong>2,971,080</strong></td>
<td><strong>80,429</strong></td>
<td><strong>10,137,325</strong></td>
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<td><strong>18,413,469</strong></td>
<td><strong>53.3</strong></td>
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Proj. EUI: 160.0
MHP - Major Hospital
Monthly Energy Consumption (kBtu/sf)

- Designed EUI = 125.0
- YTD kBtu/sf = 53.3
- Projected EUI = 128.0
What’s the WOW! Factor?

• $266,000 Annual Energy Savings
• $252/ft² construction
• $325/ft² occupied
• Reduces operational cost
• Improves health care services by:
  – Purchasing new equipment
  – FTEs
  – Financing future improvements
  – Stronger bottom line
Questions?

www.cmtae.grs.com