

Demand Response and Strategies for Hospitals

Chicago Advanced Energy Hospital Roundtable
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Presented by

Dan Doyle, P.E., LEED AP
Chairman, Grumman/Butkus Associates



Grumman/Butkus Associates
Energy Consultants and Design Engineers

Hospitals Are Energy-Intensive Facilities

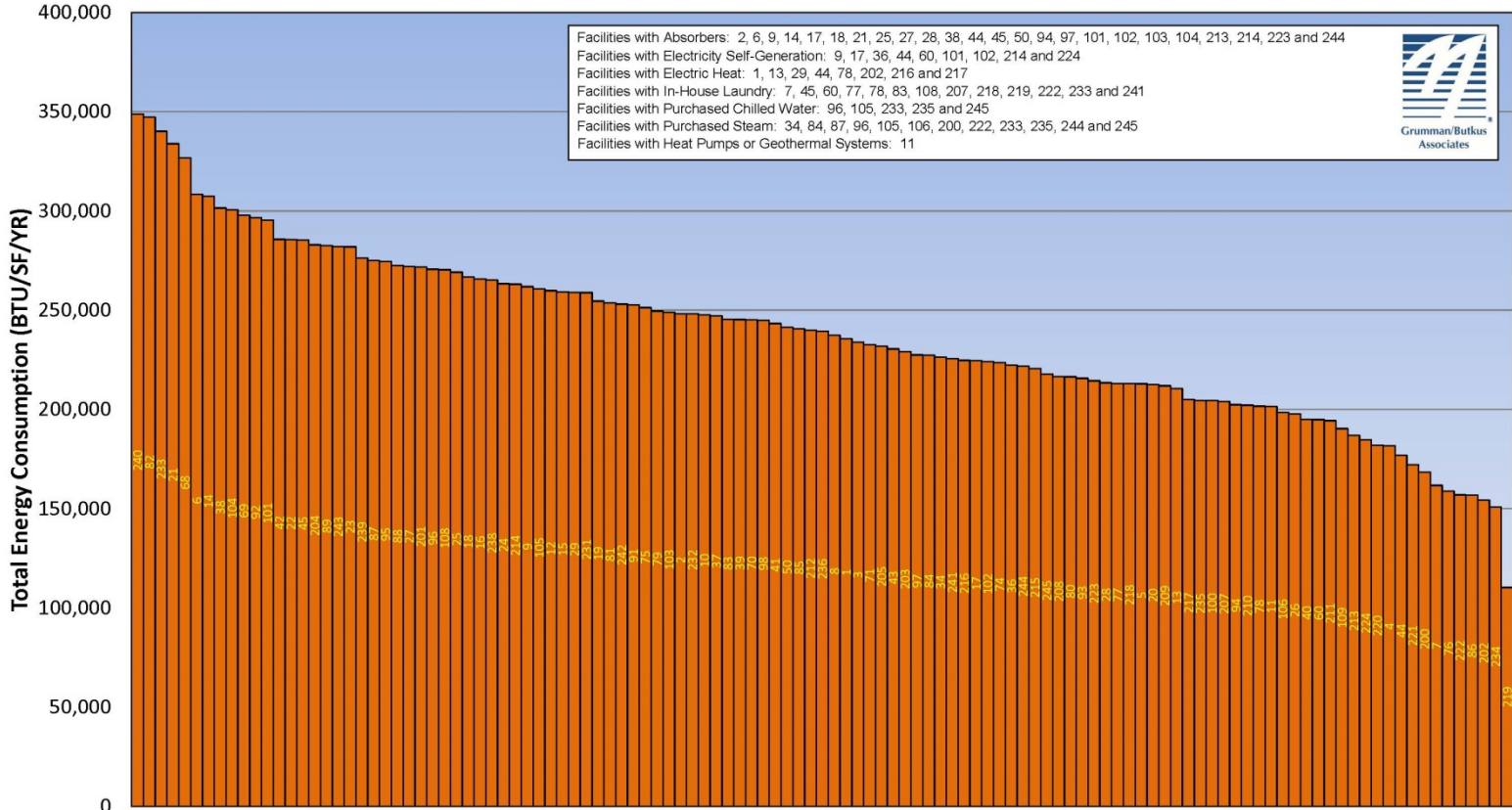
Challenge:

- Hospitals use two to three times more energy (per sq. ft.) than office buildings
 - 24/7/365 occupancy
 - Demands for high airflow, filtration
 - Lots of energy-consuming equipment (MRIs, PET scans, etc.)



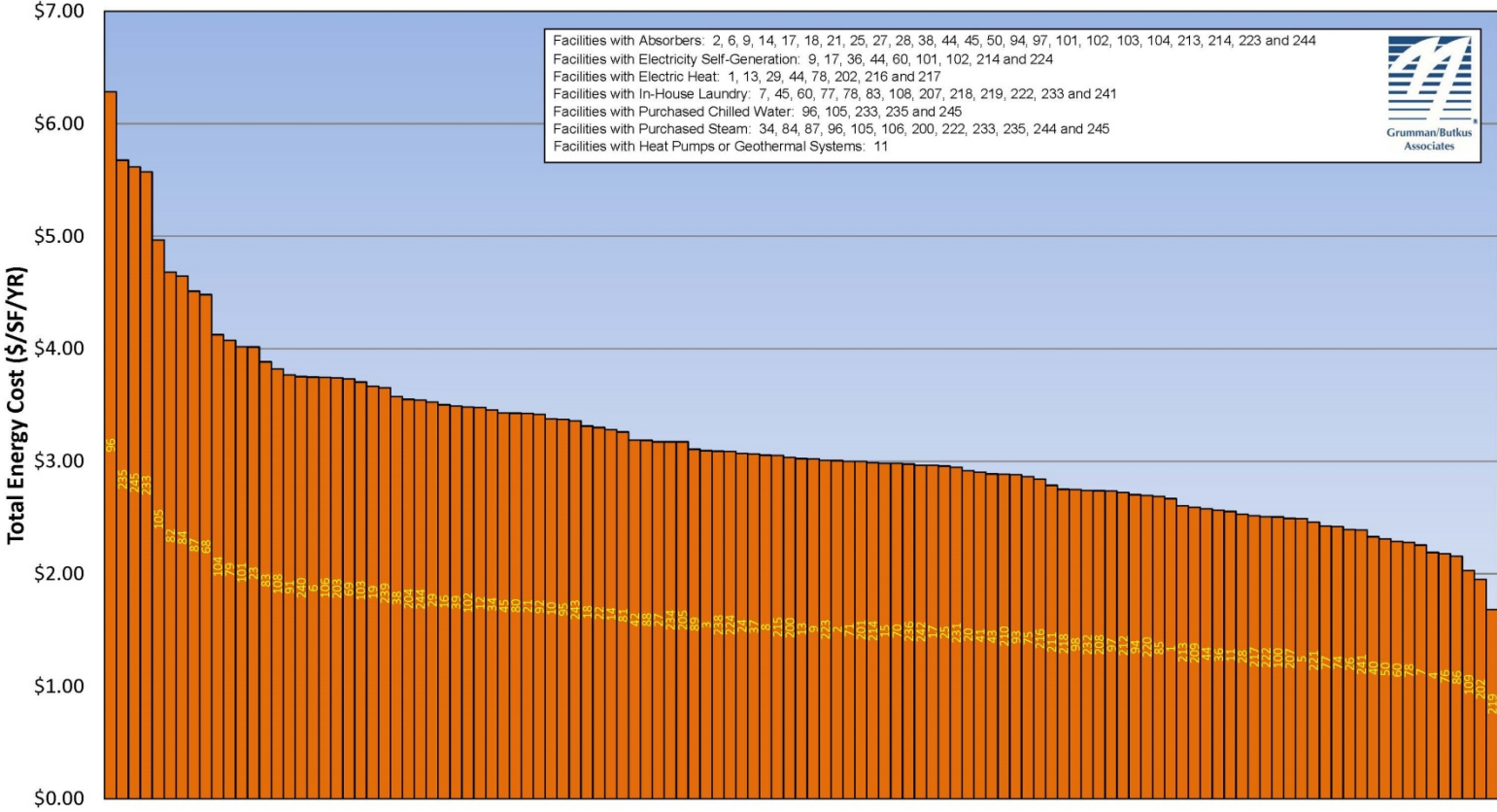
G/BA Benchmarking Survey

Year 2015 G/BA Hospital Energy and Water Benchmarking Survey For 2014 Total Energy Consumption (BTU/SF/YR)



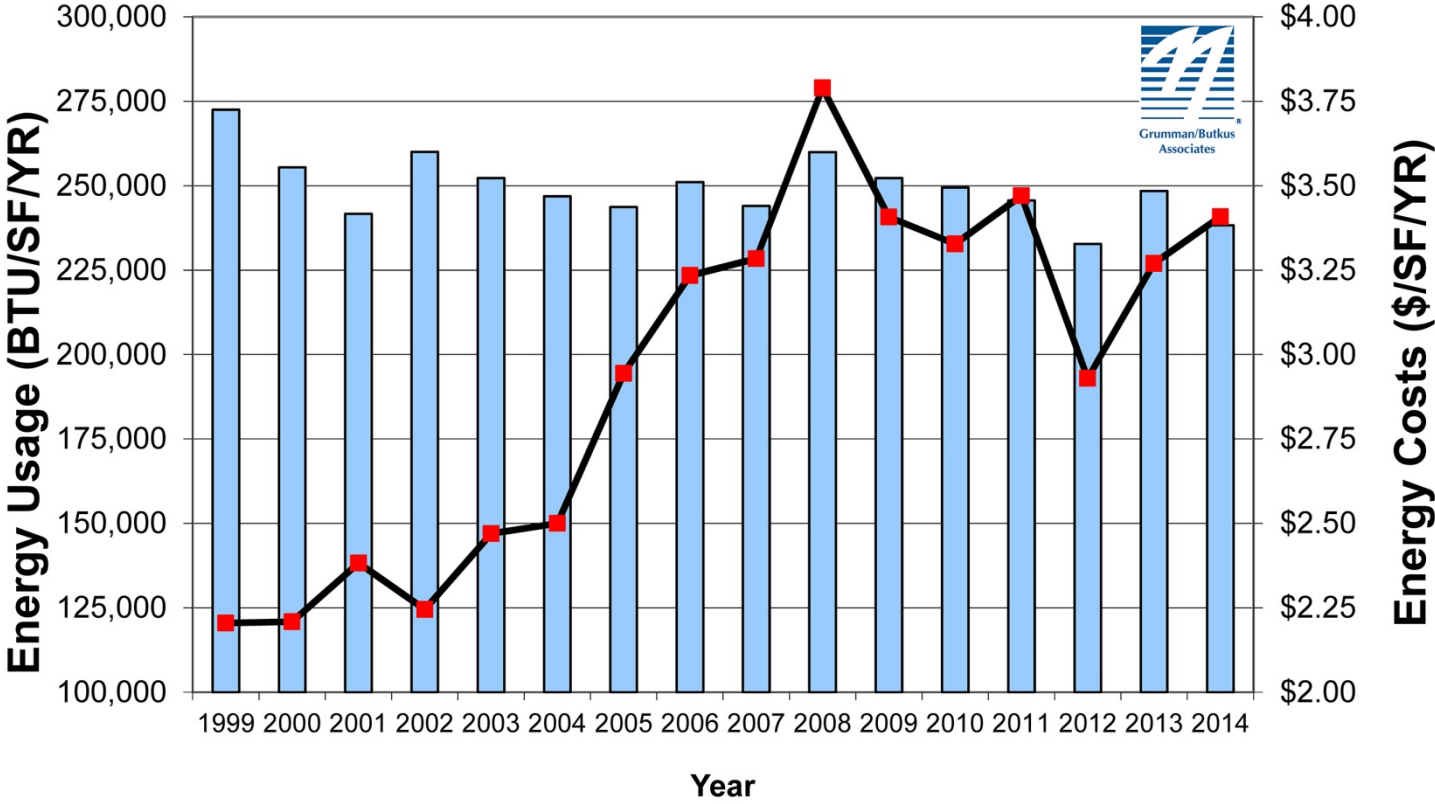
G/BA Benchmarking Survey

Year 2015 G/BA Hospital Energy and Water Benchmarking Survey For 2014 Total Energy Cost (\$/SF/YR)



G/BA Benchmarking Survey

Total Hospital Energy Use Intensity vs. Costs, 1999-2014



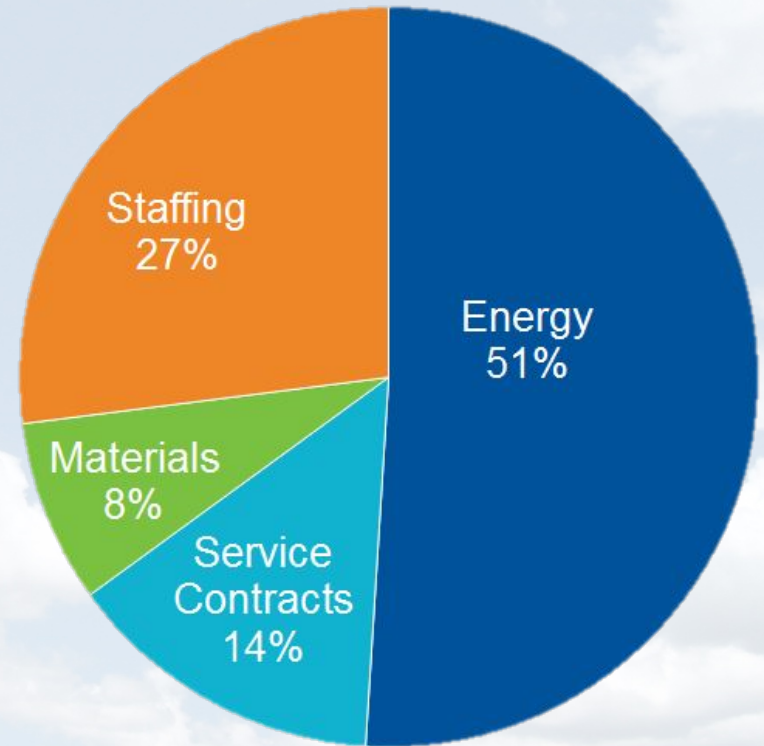
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BTU/SF/YR \$/SF/YR



ASHE Benchmarking Data: Cost Breakdown of Facility Budgets

- Energy represents more than half of the healthcare facility budget, according to current benchmarking data from the American Society for Healthcare Engineering.
- That's more than staffing, materials, and service contracts **combined**.



Hospitals Are Energy-Intensive Facilities

Opportunity:

- \$100,000 reduction in energy costs is equivalent to \$2 million in new revenues (assumes 5% ROS)
- Research by the EPA shows that hospitals that implement energy conservation measures (ECMs) outperform competing hospitals by as much as 10% in net operating income.¹

1. EPA Study, "Boosting Your Bottom Line Through Improved Energy Use," June 2005



How Can You Improve Your Performance and Reduce Costs?

Comprehensive Approach:

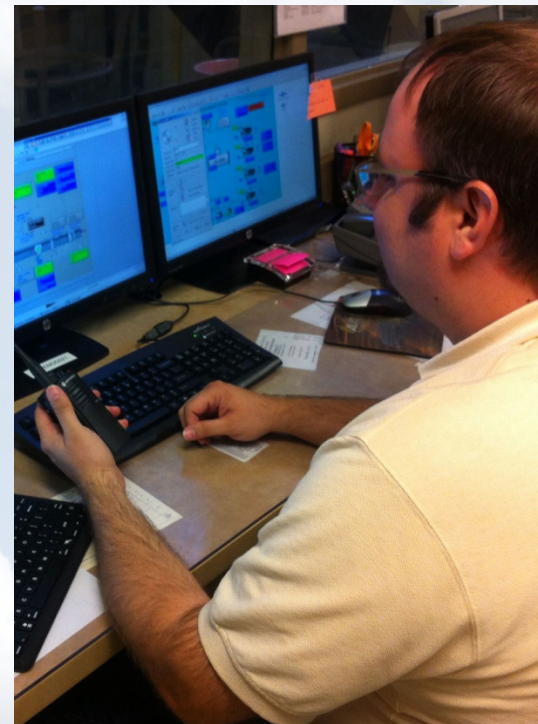
- Utility tracking
- Benchmarking
- Energy purchases/
supply-side management
- Operations and maintenance
- Retro-commissioning (RCx)
- Retrofit of existing building
systems/equipment
- Demand response options
- Building infrastructure planning
- New buildings, major additions
& renovations
- Commissioning and monitoring-
based commissioning (Cx,
MBCx)
- Equipment purchasing policies
- Grants and rebate opportunities
- Recognition opportunities
- Financing options



Retro-Commissioning (RCx)

- Over the past six years, G/BA has completed RCx at 24 Midwestern hospitals.
- **24 Midwestern hospitals**
 - Average size: 820,228 square feet
 - Average energy use: 269 kBtu/ft²/year
 - Average energy cost: \$3.59/ft²/year
 - Average cost savings: \$111,353/year
 - Average energy cost reduction due to RCx: 6.2%
 - Average RCx payback: 5.76 months*

**Excludes RCx fees, paid by local utility*



Energy Retrofits



- Over the past six years, G/BA has completed ASHRAE Level 2 energy audits for 31 Midwestern hospitals.
- **31 Midwestern hospitals**
 - Average size: 757,960 square feet
 - Average energy use: 240,451 Btu/ft²/year
 - Average energy cost: \$2.98/ft²/year
 - Average cost to achieve 5% cost reduction: \$475,000
 - Average payback for 5% cost reduction: 3.4 years
 - Average cost to achieve 10% cost reduction: \$985,000
 - Average payback to achieve 10% cost reduction: 4.9 years



Energy Cost Reduction Opportunities

- **Where do you typically find savings?**
 - Lighting
 - Central heating / cooling plants
 - HVAC
 - Process / equipment
 - Demand response
- **How much can typically be saved?**
 - Hospitals that implement all measures with an aggregate payback of six years
 - 25% to 35% savings



Demand Response History

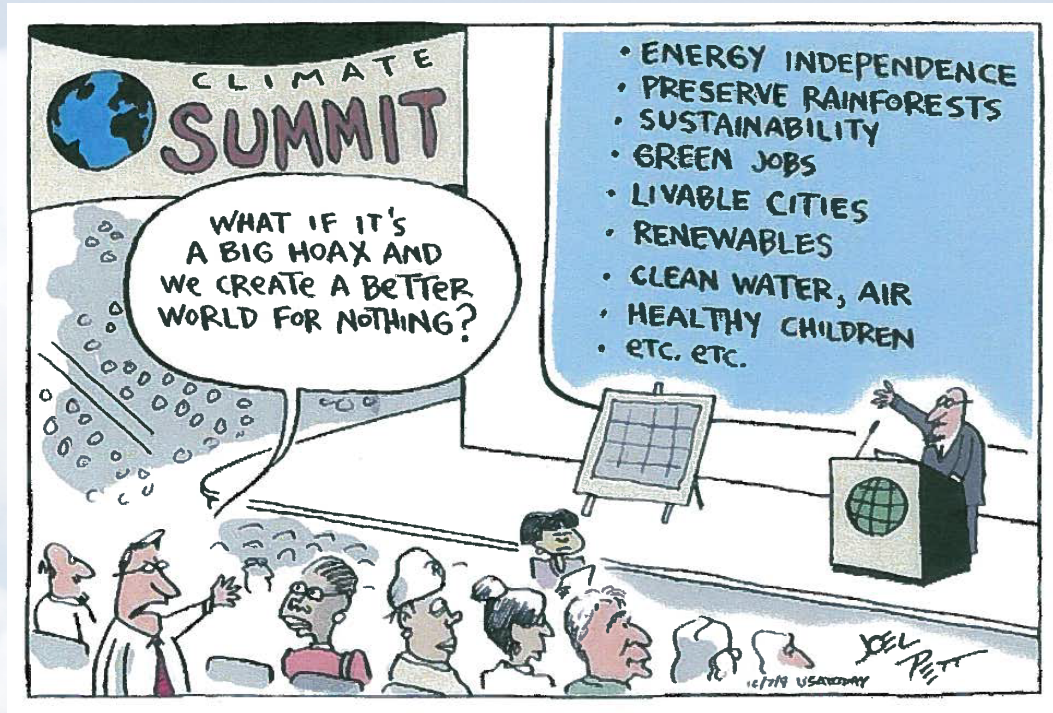
- Load reduction
- Load shifting
 - TES
- Self-generation
 - Can also recover waste heat (CHP)



Self Generation Issues

- Economics
- Emissions
- Resiliency





Dan Doyle, P.E., LEED AP
Chairman
Grumman/Butkus Associates
ddoyle@grummanbutkus.com
(847) 316-9219

Questions?

