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Corporate Realty, Design & Management Institute

IFMA Healthcare Council

Healthcare Seminar Series

Energy, Economics & Environment: Making the 3 E's Work Together in Healthcare

A Program of - Corporate Realty, Design
& Management Institute
Contact - 503-274-7162
www.squarefootage.net



In Partnership with - IFMA Healthcare Council
www.ifma-hc.org



Energy, Economics & Environment

Making the 3E's Work Together in Healthcare

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Let's Get Acquainted...

- **Affiliation**
AIA, ASHE, ASHRAE, ASID,
BOMA, HFMA, IFMA, IIDA,
USGBC
- **Organization**
A & D or M E & P
Hospital
Medical Research Facility
Non Medical
- **Upgrade or Modernization**
- **New Construction**



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Agenda

- A Quick Survey
- Vital Signs & Crystal Ball
- Systems Approach to Energy, Economics & Environment
- The List
- Break
- Survey Results
- Panel Session – Q&A
- Adjourn

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A Quick Survey:

Twelve Questions

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Question # 1

- Where do you project the highest demand for future healthcare facilities?

- Acute care
- Outpatient services
- Assisted living

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Question # 2

- How high do you think energy costs will rise in the next year?

- 1 to 3%
- 4 to 6%
- 7% or Higher

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Question # 3

- Every dollar average hospital saves on energy is equivalent to generating how much revenue?

- \$1
- \$10
- \$25

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Question # 4

- Saving \$1 per sq. ft. a year is equivalent to how much revenue for the average size hospital?

- \$1 million
- \$7 million
- \$12 million

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Question # 5

- What concerns you the most about installing or specifying energy saving new technology?

- Will become quickly outdated
- Reliability
- May not deliver projected performance

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Question # 6

- Which of these issues do you worry about the most in the operations of your facility?

- Management of utilities
- Reliability of infrastructure
- Regulatory pressure

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Question # 7




- Compared to other industries, how effective is healthcare in implementing sustainable solutions?

-  Better
-  Same
-  Worse

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Question # 8

- What took precedence in the final selection on equipment and materials on your last project?

-  Durability or expected life of the item
-  Initial cost
-  Sustainable features

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Question # 9

- To retool a hospital for sustainability, what do you think is the most important next step?

- Create a Sustainability Steering Committee
- Designate a person as the sustainability manager
- Obtain building certification such as Energy Star or LEED

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Question # 10

- How prevalent do you think green-washing is today among manufacturers and suppliers?




- Less prevalent than 2 years ago
- More prevalent than 2 years ago
- No change over the past 2 years

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Question # 11




- Do you employ evidence based design on your projects?

-  Rarely or Never
-  Occasionally
-  Almost Always or Always

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Question # 12

- Do you research scientific sources prior to selecting products or equipment?

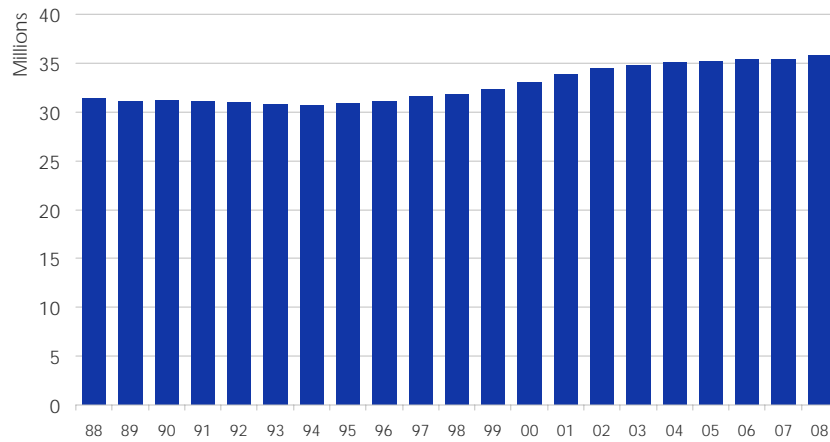
-  Rarely or Never
-  Occasionally
-  Almost Always or Always

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Vital Signs:

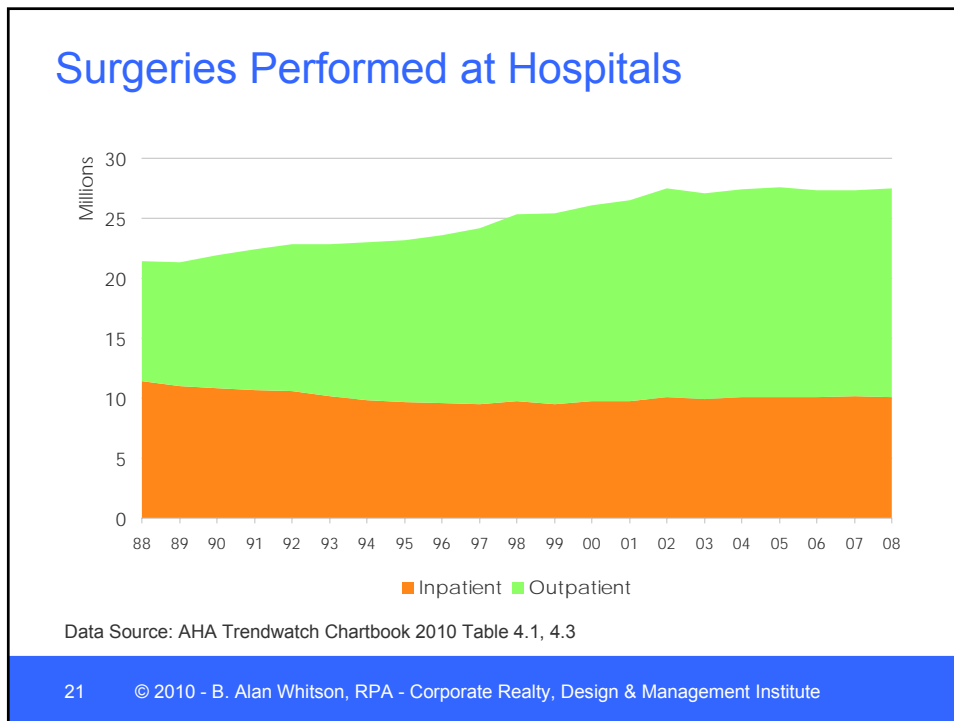
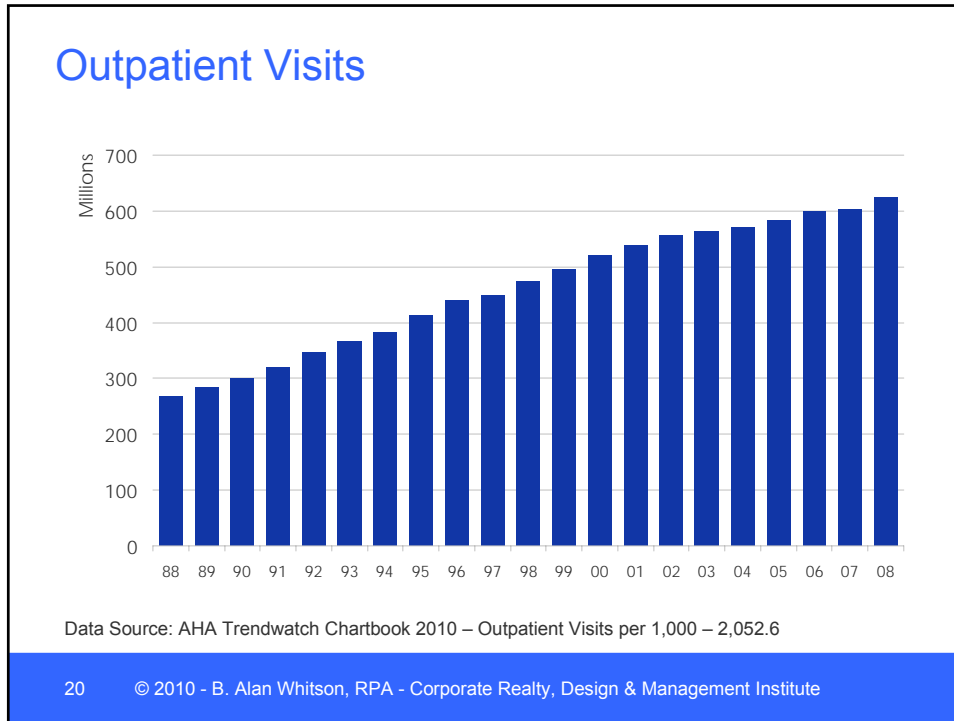
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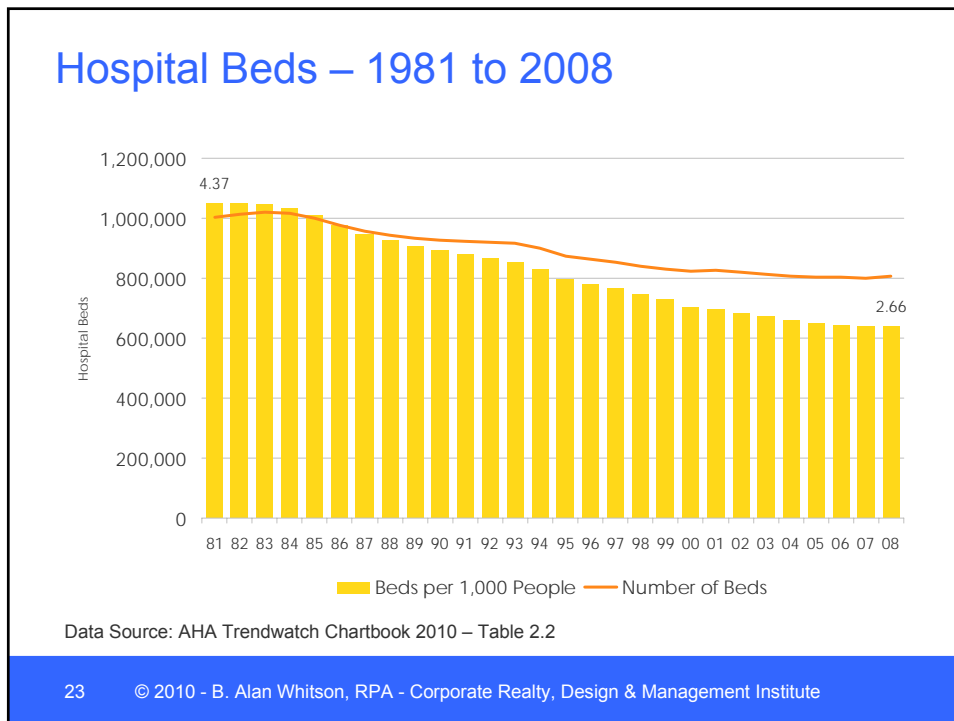
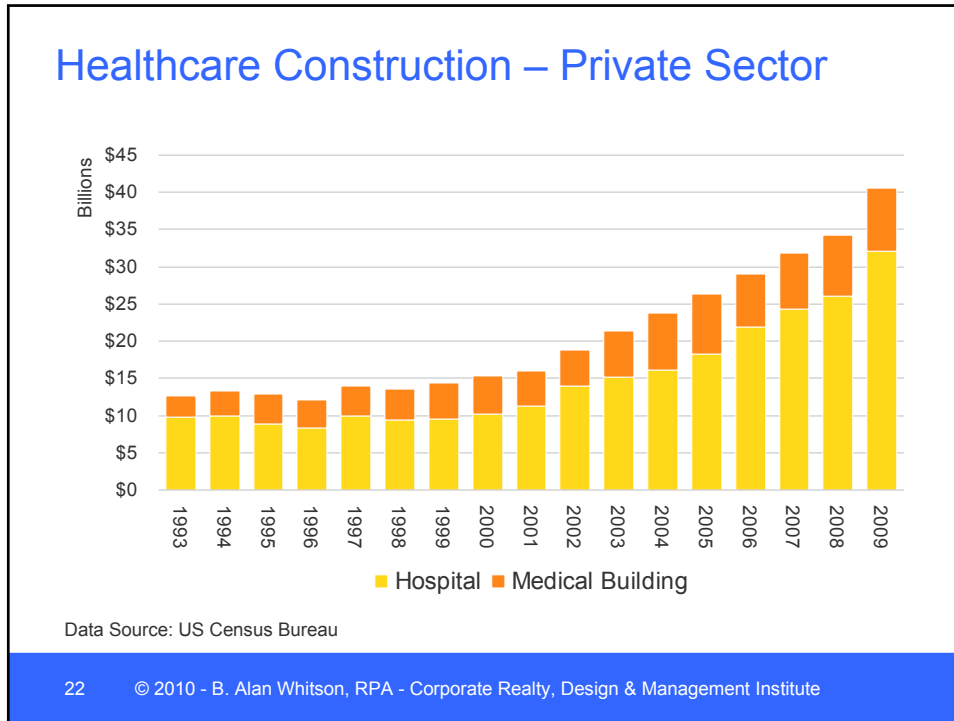
Inpatient Admissions

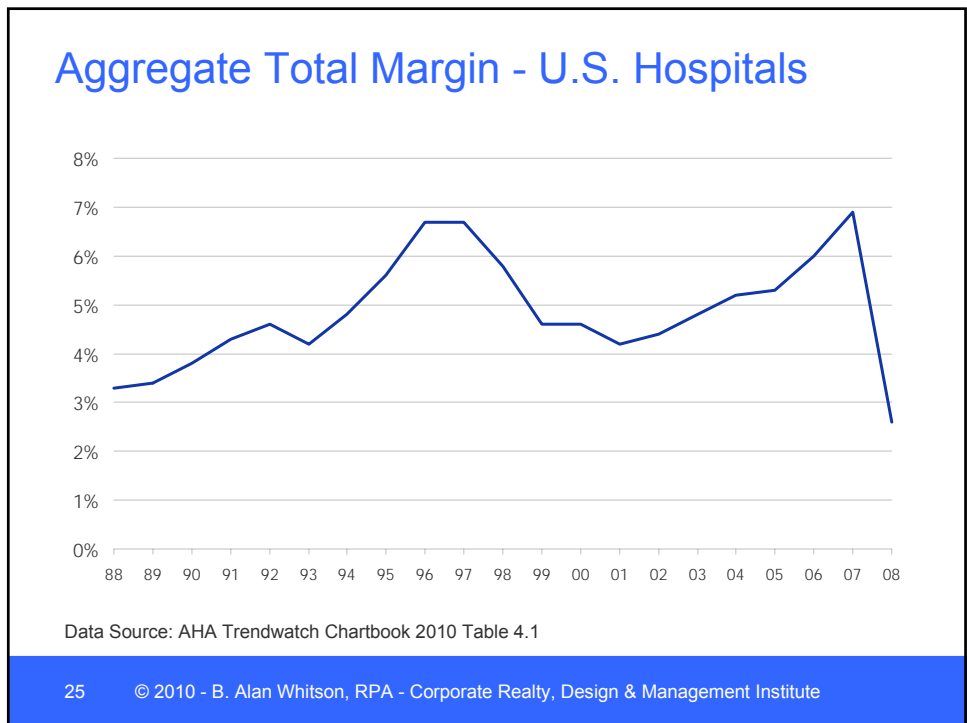
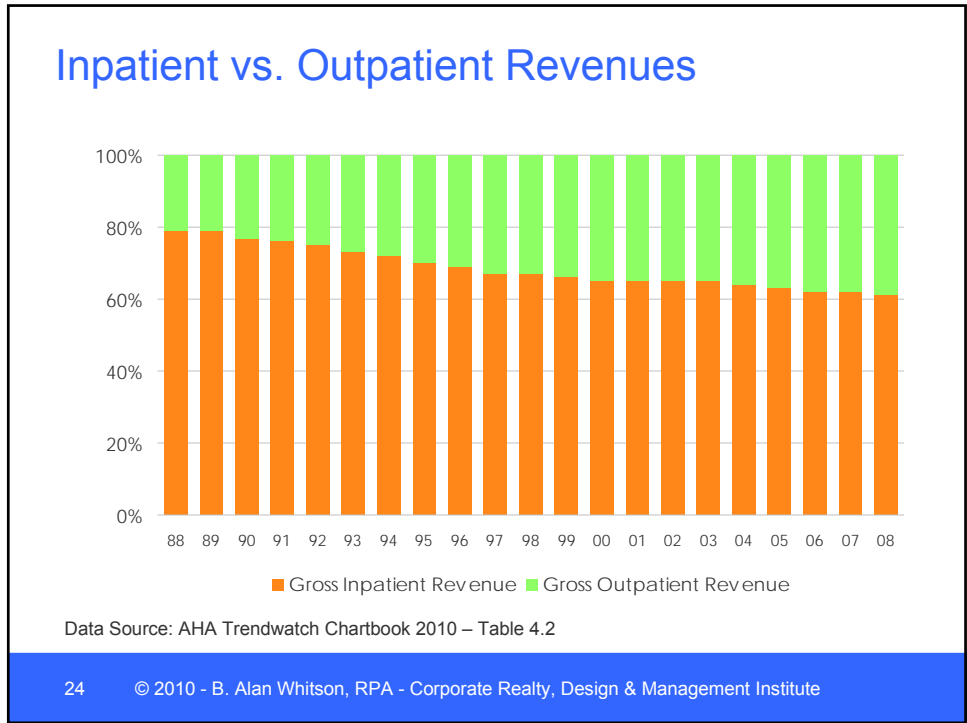


Data Source: AHA Trendwatch Chartbook 2010 – Admissions per 1,000 – 117.6

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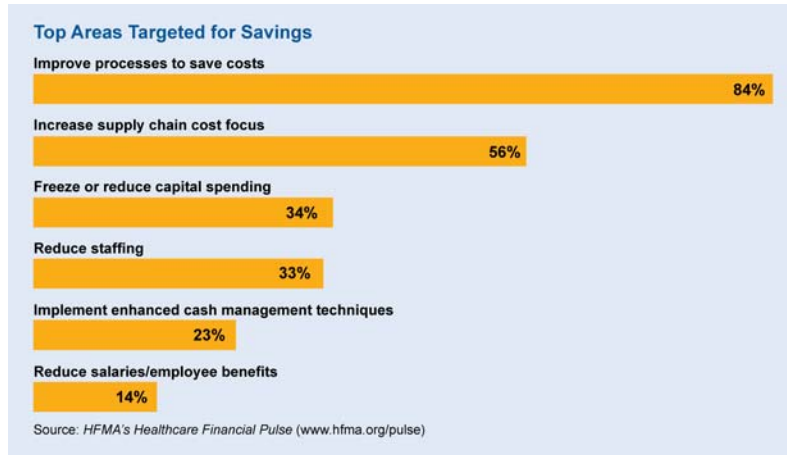




HFMA Financial Pulse

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Areas Where Savings Will Be Achieved



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Cost & Quality

- Create a sense of urgency for change within organization
- Employ systematic process improvement
- Focus attention on high-cost, high-volume, and problem-prone processes
- Focus on value: Identify improvements that enhance quality while they drive down cost
- Assess processes broadly enough to avoid unintended consequences
- Ask the “why do we do it this way” question to eliminate unnecessary steps

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Cost & Quality (continued)

- Employ and manage to metrics, ensure that those who have greatest influence over costs and revenue have the right data to support day to day decision-making
- Better leverage technology to increase efficiency and effectiveness
- Review external partnerships to shore up core competencies or use alternative delivery methods
- Foster a collaborative environment that encourages the sharing of best practices

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Wise Capital Spending

- Put all current and planned capital projects through a formal assessment project to determine cost, ROI, and relationship to strategic goals and mission
- Review amount of capital available and develop short- and long-term plans
- Review assets base for opportunities to sell assets not vital to strategic direction
- Educate staff & board on capital process for unexpected items, requiring value analysis before purchase
- Use formal process to determine organizational risk tolerance

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Crystal Ball:

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The Crystal Ball...

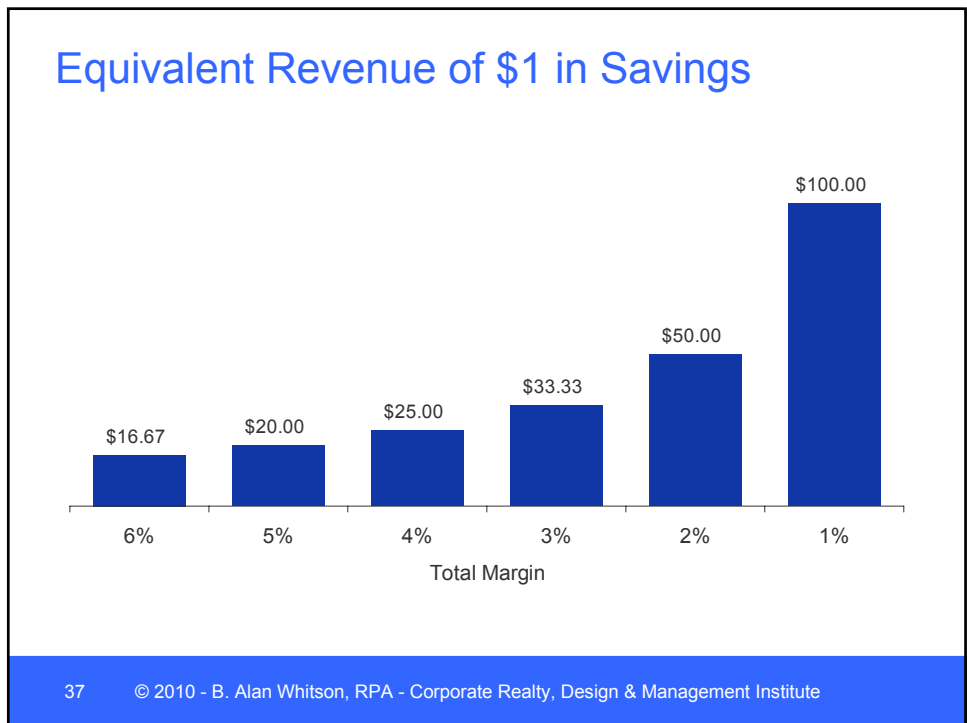
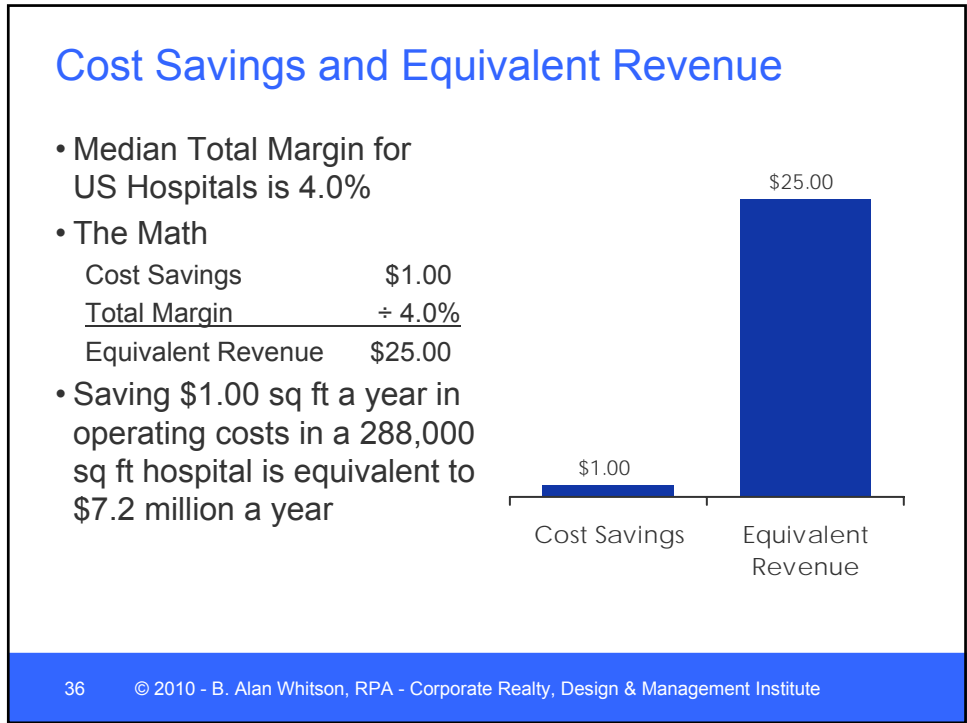
- Consolidation – “Haves” & “Have Nots”
 - Location & Demographics = Key Success Factors
 - Financial Hangover from the Great Recession
 - Hybrid Financial Model
- “Hub & Spoke” Model
 - Outpatient Clinics – Feeder to Main Campus
 - Walk In Community Clinics Adjacent to ED
- Increased Transparency
- Increased Acuity Level in Hospitals
- Rising Healthcare Costs
 - Labor Cost, Technology & Healthcare Culture
 - Rationing - \$\$
 - Increase in Hospice Care
- Competition
 - Specialty
 - Forgein

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Catalyst & Drivers

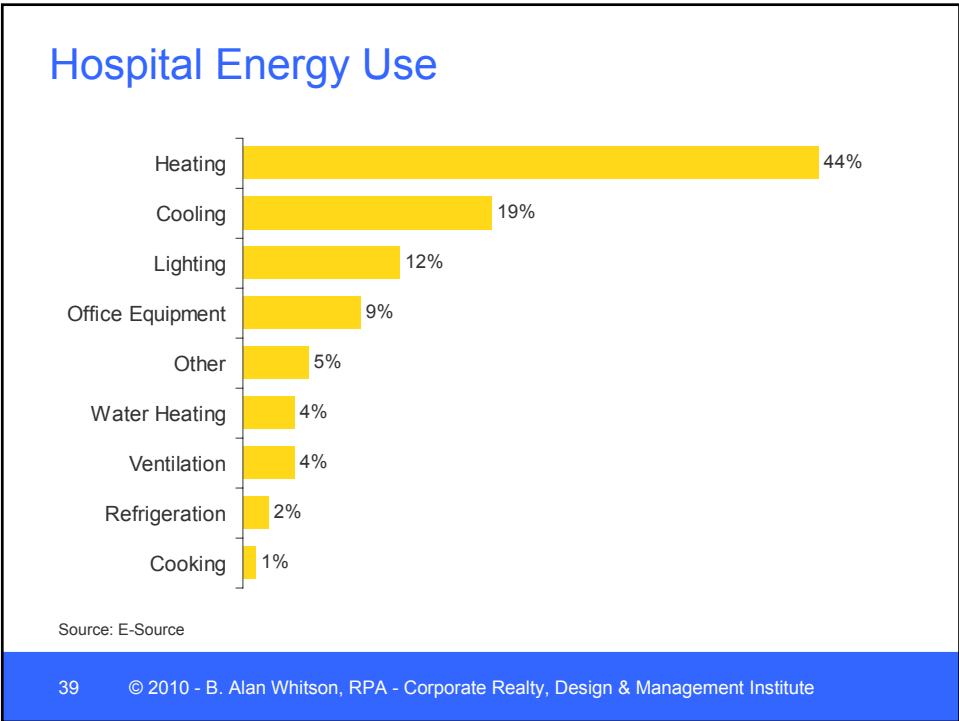
- New Economy
 - Get Lean or Die
 - Flatter Organization
- Labor Shortages & Cost
 - Time & Steps = \$\$
 - More Nursing in the Workday
- Sustainability
 - Remanufacturing
 - Energy Costs & Incentives
 - Outsourcing Central Plant
 - Life Cycle Cost
 - Plug & Play – Modular
- New Construction
 - Building Information Modeling
 - Integrated Project Delivery
 - Building Science
 - Performance vs. 1st Cost
- Reuse of Retail Space
 - Big Box
 - Malls

Energy, Economics & Environment

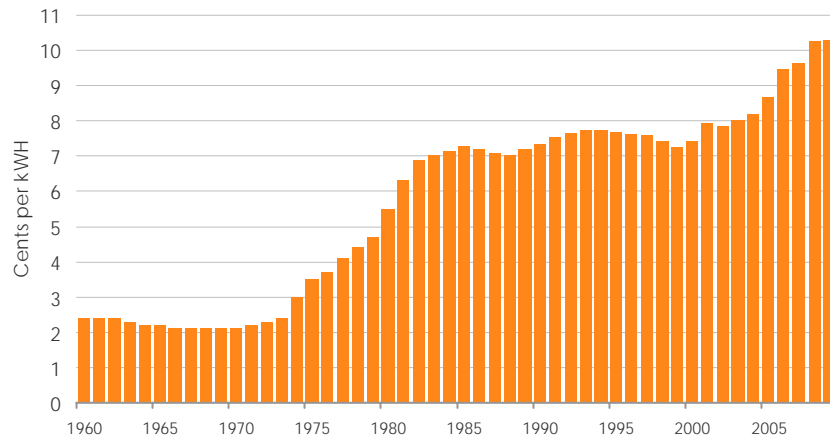


Energy

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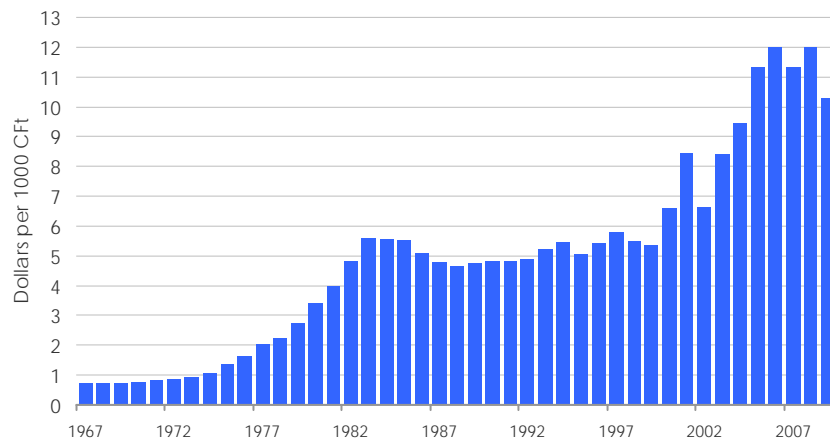


Commercial Electricity Price – U.S. Avg.

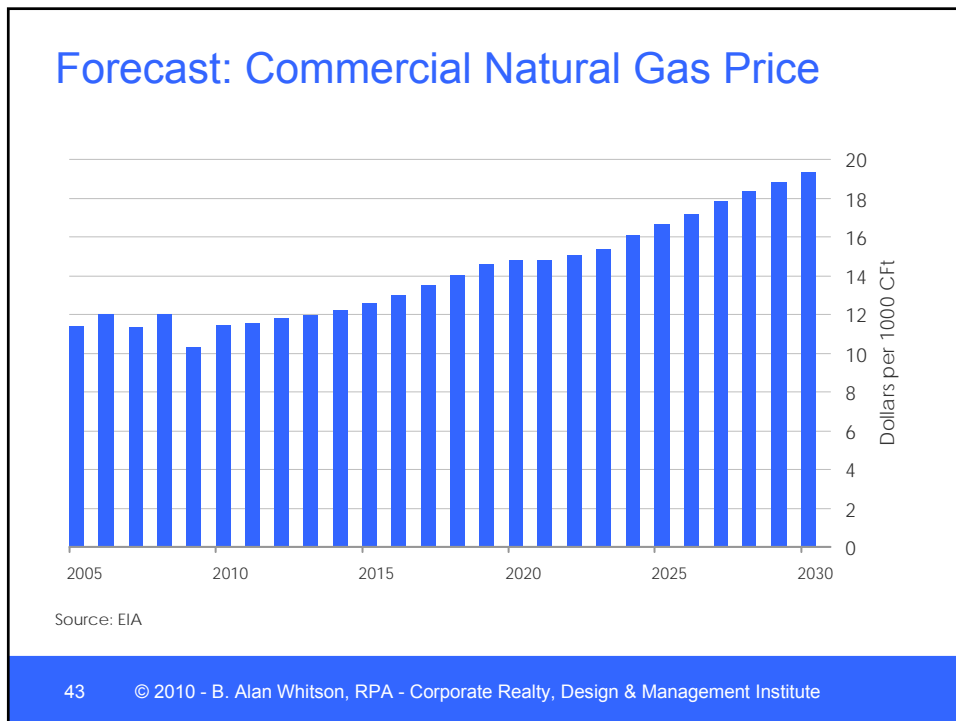
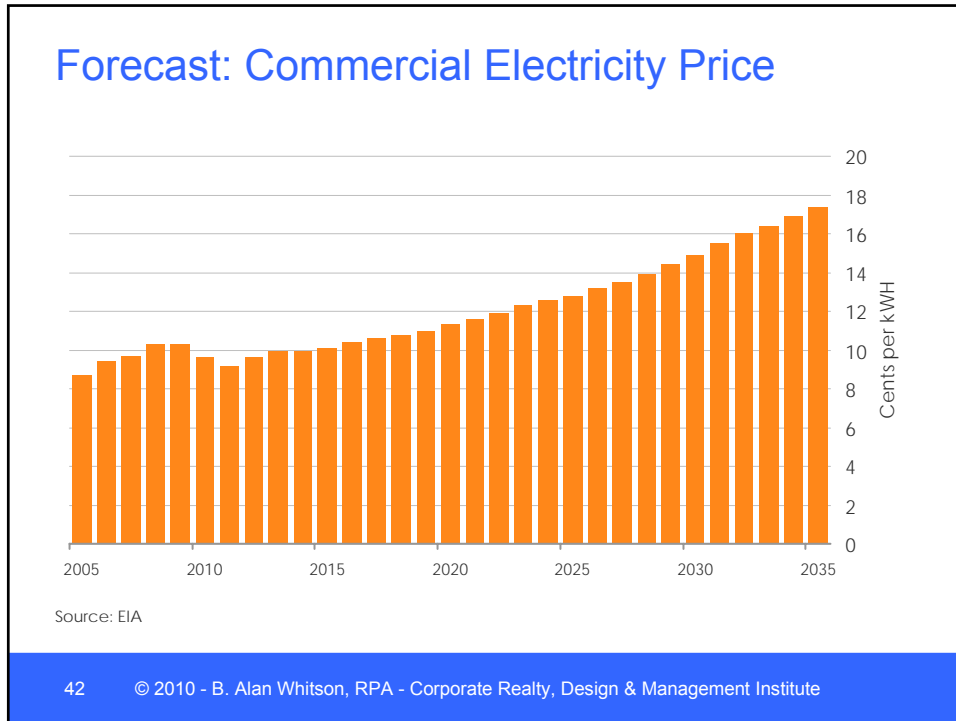


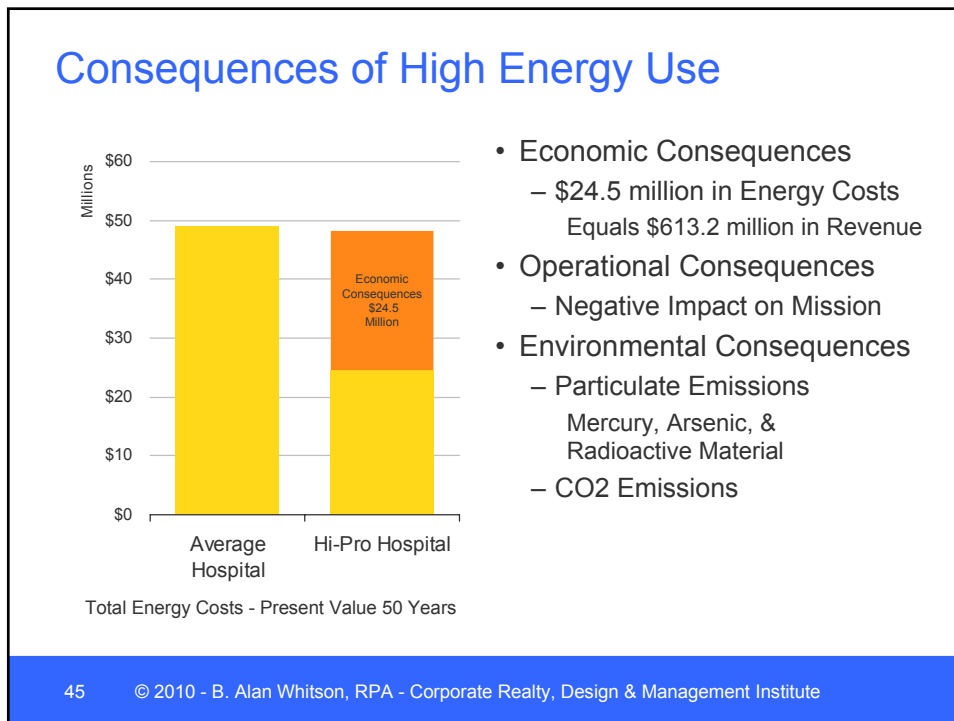
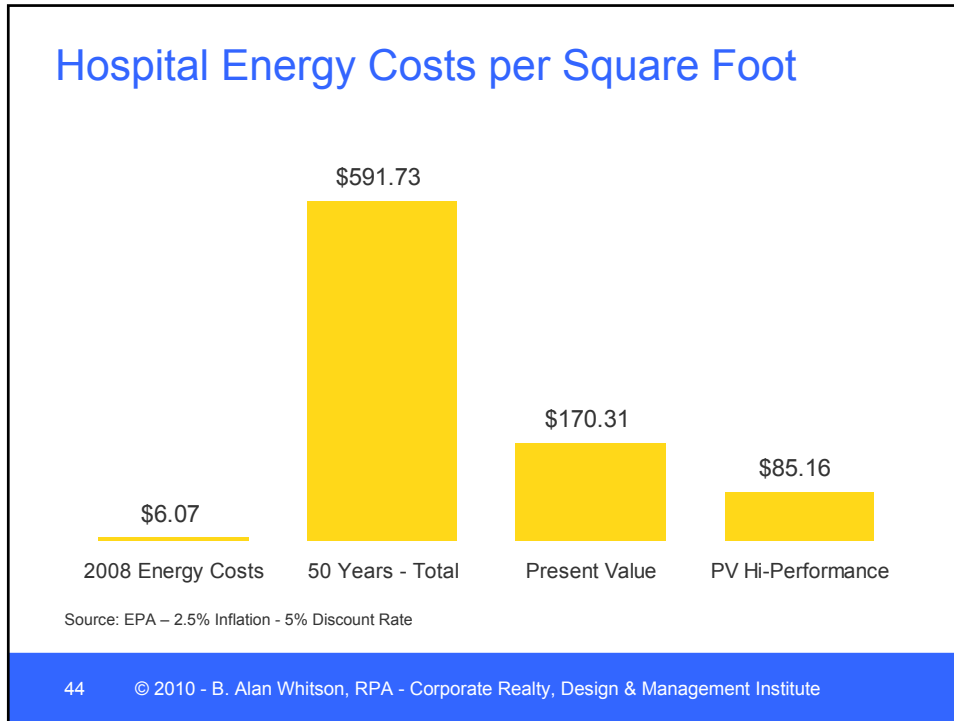
Source: EIA – Form EIA 826 - Oct 2009 Table 5.3 US Annual Avg.

Commercial Natural Gas Price – U.S. Avg.



Source: EIA – US Annual Avg.





Energy Use in Energy Star Hospitals

Facility	City	Sq. Ft.	KBtu/Sq Ft/Yr
Shriners Hospital for Children	Houston, TX	150,562	190
Kosciusko Community	Warsaw, IN	170,889	106
UCSF at Mt. Zion Medical Center	San Francisco, CA	309,637	253.8
NY Presbyterian - Allen Pavilion	New York, NY	345,000	155.9
Tri-City Medical Center	Oceanside, CA	510,000	237.4
Millard Fillmore Gates	Buffalo, NY	880,000	197.5
Providence Portland Medical Center	Portland, OR	908,815	209.6
Bronson Methodist	Kalamazoo, MI	1,326,677	96.8
VA Healthcare	Albuquerque, NM	1,409,800	106.7
St. Francis Medical Center	Hartford, CT	1,440,809	221.1
The Christ Hospital	Cincinnati, OH	1,450,737	229

Source: EPA Energy Star

Strategy & Tactics

Comprehensive Energy Strategy

1. Reduce Energy Use

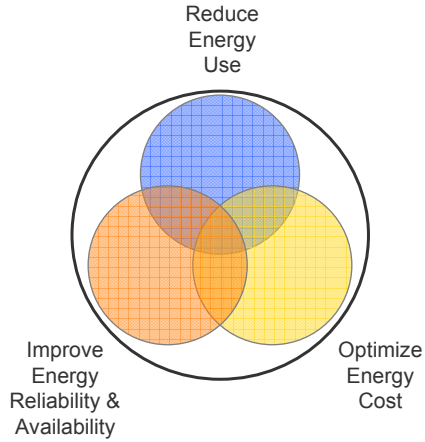
- Reduce energy consumption in all levels of the operation

2. Optimize Energy Cost

- Reduce acquisition cost of energy used by organization

3. Improve Energy Reliability & Availability

- Ensure reliable and efficient operation of equipment
- Minimize risk of outages through design & strategy



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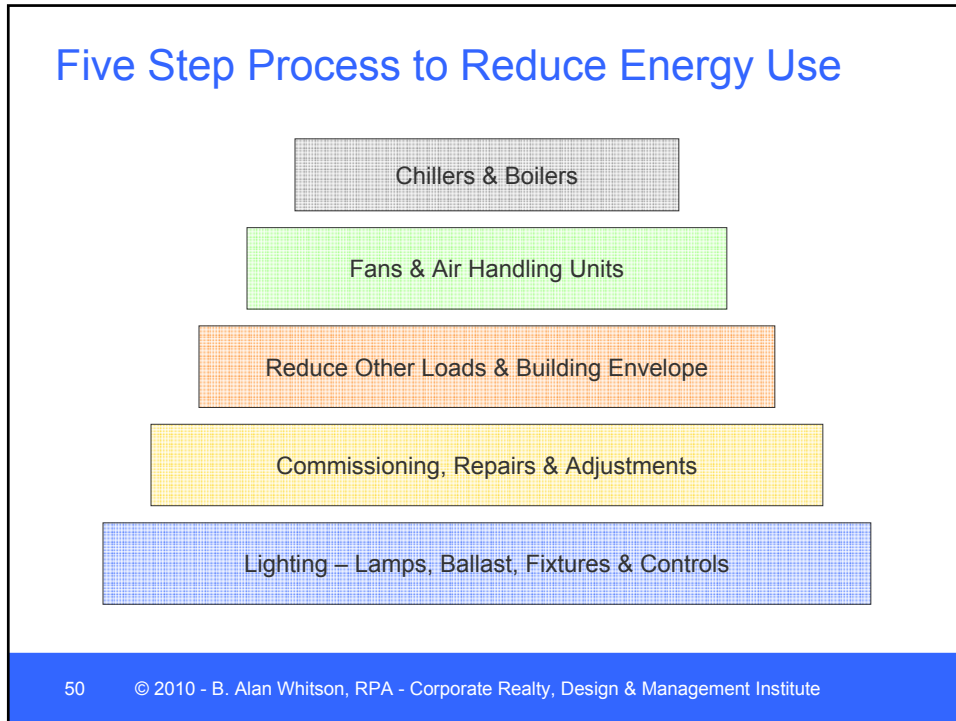
Tactical Approach to Energy Efficiency

- **Integrate Systems into Network**
 - Lighting control, temperature control, shutter/window treatment control, stand alone electronics, and modular solutions
- **HVAC**
 - Variable speed drives for HVAC, pumps, and fans.
- **Energy Management**
 - Power factor correction, filtering, power monitoring and analysis
- **Facility Services**
 - Integrated service provider for maintenance and management of energy savings and supply



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Case Study: Combined Heat & Power System Dell Children's Hospital

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Combined Cooling/Heating Power Plant

- Austin Energy built an \$18 million CCHP
- Increased fuel energy conversion efficiency from 29% to 75%
- Saved Dell \$6.8 million on boilers, chillers, cooling towers, backup generators, and space
- \$5.8 of savings spent in other energy measures



Dell Children's Hospital – Austin, TX

Lighting

Better Lighting = Better Outcomes

- Use daylight where possible
- Use controls to turn lights down or off when not needed
- Optimize lamp, ballast and fixture efficiency
- High CRI > 80
- IESNA suggestions:
 - Nurse Station 53 FC
 - Patient Room 30 FC
 - Task Lighting 50 FC
 - Ambient Lighting 25 FC
 - Offices with computers

Variations of +/- 33% from IESNA recommended light levels can be considered as "the same" light level



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Target Areas for Light Control

- Exterior
 - Signage
 - Building
 - Parking
 - Walkways
- Common Areas
 - Lobbies
 - Corridors
 - Cafeteria
 - Gift Shop
- Offices
- Emergency Dept.
- Labs, Imaging & Pharmacies
- Surgery
- Nurse Stations
- Corridors
- Patient Room
 - Staff Zone
 - Patient Zone
 - Bathroom
 - Family Zone
- Family Lounges
- Therapy Rooms
- Outpatient Clinic
- Staff Lounges
- Morgue
- Store Rooms
- Support Areas
 - Kitchen
 - Laundry
 - Shipping & Receiving
 - Workshops
- Equipment Spaces

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Lighting Control Strategies

Room	Load Type		Energy Control Strategy				Window Treatment			Whole Building Integration				
	Dimmed	Non-Dim	Astronomic Timeclock	Occupancy Control	Local Wall Control	Daylight Compensation	Peak Demand Mgmt	Scene Control	Manual	Motor	Auto	Centralized Control	Energy Monitoring	BMS Integration
Parking		X	X											
Exam Room	X			X	X		X					X	X	X
Surgical	X				X		X						X	
Corridor	X		X		X		X					X	X	X
Patient Room	X			X	X	X	X		X			X	X	
Admin Office	X		X	X	X	X	X	X				X	X	X
Conf. Room	X			X	X	X	X		X			X	X	X
Cafeteria	X				X	X	X	X		X	X	X	X	X

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Effective Lighting for Patient Rooms

- Match Controls, Lamp, and Fixture to Type of Use & Occupant Zone
- Color Rendering Index (CRI) above 80
- Lighting Scenes
 - Ambient – 5 Foot candles
 - Reading – 30 Foot candles at patient torso
 - Exam – 100 Foot candles at patient torso



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Elevator Lighting

- Industry Default 200 Watts
 - 5 Watts per Sq. Ft
 - About 1/3 the energy of a low rise hydraulic elevator
- Alternative Light Sources
 - Fluorescent
 - LED
- R14 vs. LED
 - R14 25W x 30 x 8,760 = 6,570 kwh
 - LED 3W x 30 x 8,760 = 788 kwh



Case Study: Fluorescent Lighting

Linear Fluorescent Lamps – 4 Foot

Lamp	Watts	Mercury mg	CRI	Avg Life Hours	Initial Lumens	Design Lumens	Lumen Maint.	Lumens per Watt
T12	40	4.4	70	20,000	3,200	2,800	65%	70.0
T12	34	4.4	62	20,000	2,650	2,300	65%	67.7
T8	34	6.0	75	24,000	2,700	2,320	86%	68.2
T8	32	1.7	75	20,000	2,800	2,660	95%	83.1
T8	32	1.7	85	24,000	3,100	3,000	97%	93.8
T8	32	1.7	85	36,000	2,950	2,800	95%	87.5
T8	32	1.7	85	46,000	2,950	2,800	95%	87.5
T8	25	1.7	85	46,000	2,600	2,330	97%	93.2
T5	28	1.4	85	20,000	2,900	2,750	95%	98.2
T5 HO	54	1.4	85	25,000	5,000	4,750	95%	88.0

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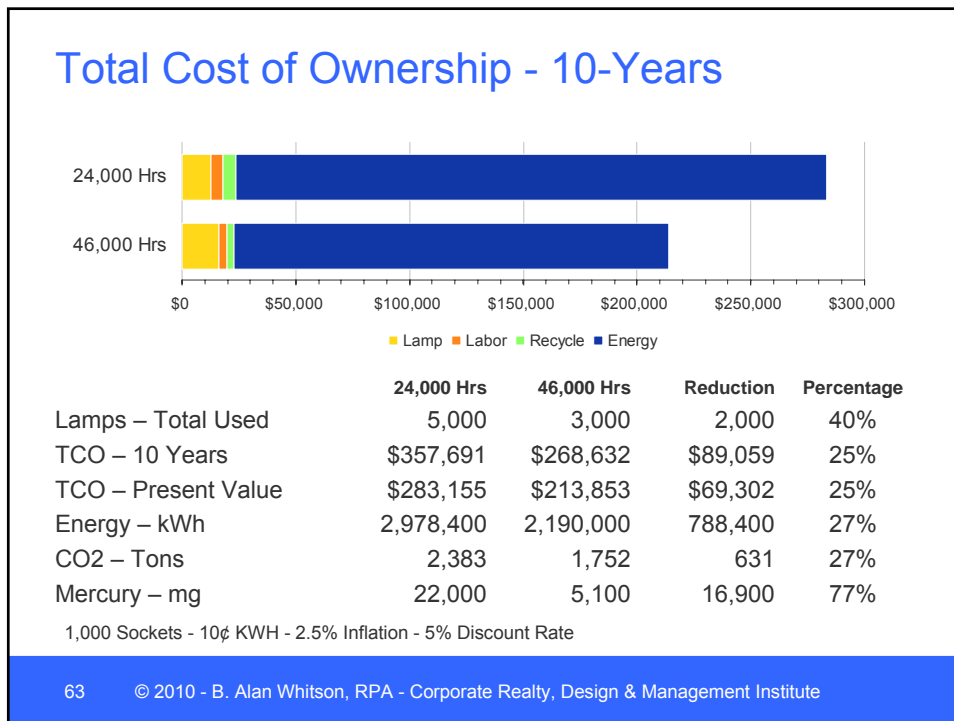
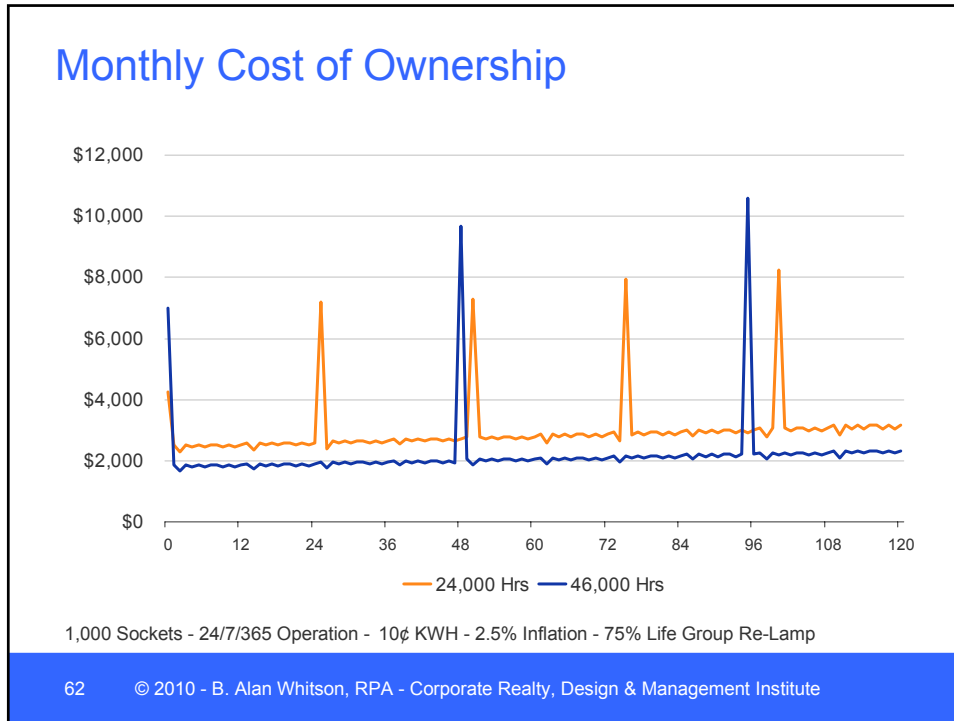
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T8	32	1.7	75	20,000	2,800	2,660	95%	83.1
T8	32	1.7	85	24,000	3,100	3,000	97%	93.8
T8	32	1.7	85	36,000	2,950	2,800	95%	87.5
T8	32	1.7	85	46,000	2,950	2,800	95%	87.5
T8	25	1.7	85	46,000	2,600	2,330	97%	93.2
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T5 HO	54	1.4	85	25,000	5,000	4,750	95%	88.0

*\$2.26

*\$5.00

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Building Envelope

Typical Hospital Building Envelope

On a Sunny Day 95° F

- Dark Roof 180° F
- Window 120° F
- Interior Space 75° F

Building Era	<1980	>1980
Percent Glass	25	25
Shading Coefficient	.71	.66
Window R-Value	1.79	1.96
Wall R-Value	0.3	6.9
Roof R-Value	12.3	11.5



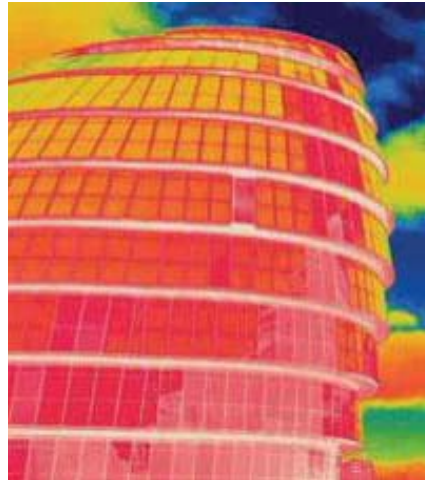
Source: DOE - ORNL

Building Envelope & Building Science

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Building Science Basis

- Heat Flows
 - From Warm To Cold
- Moisture Flows
 - From Warm To Cold
- Moisture Flows
 - From More To Less
- Air Flows
 - Higher Pressure to Lower Pressure
- Gravity Acts Down



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Building Envelope

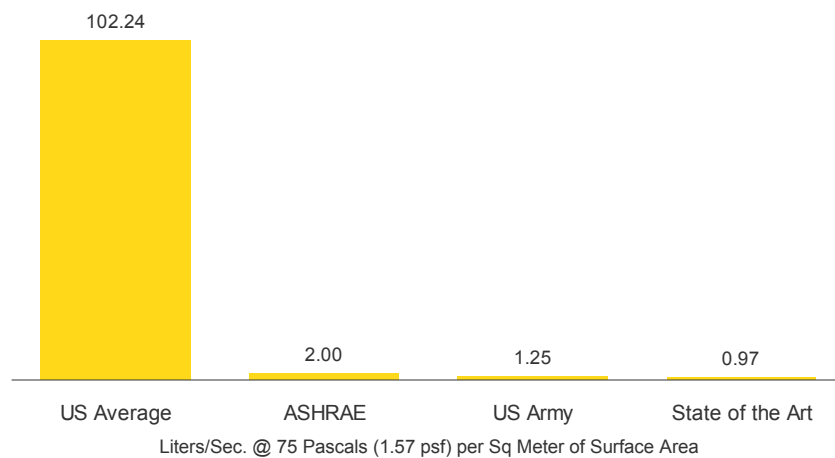
- Building envelope design should include five performance objectives, including a structural layer, for the perfect wall.....
 - Rain Control Layer
 - Air Control Layer
 - Vapor Control Layer
 - Thermal Control Layer
 - Structural Layer



Source: Joe Lstiburek, PHD; P. Eng.

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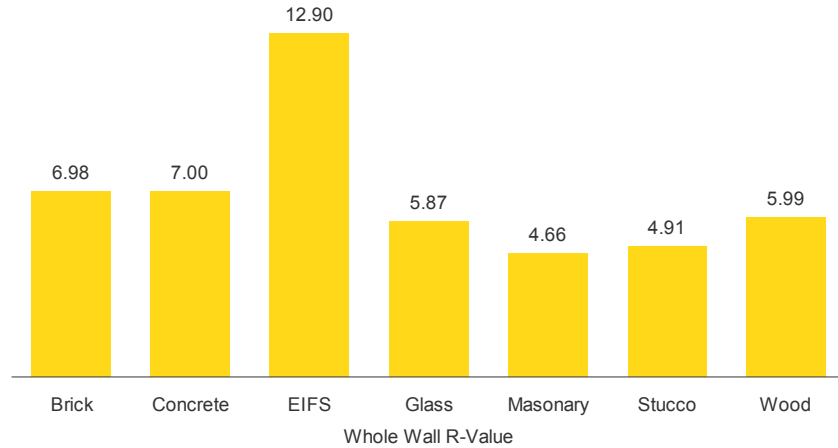
Air Leakage – Building Envelope



Source: NIST, S. Emmerich - 2005

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Thermal Efficiency - Exteriors Walls



Source: DOE - ORNL

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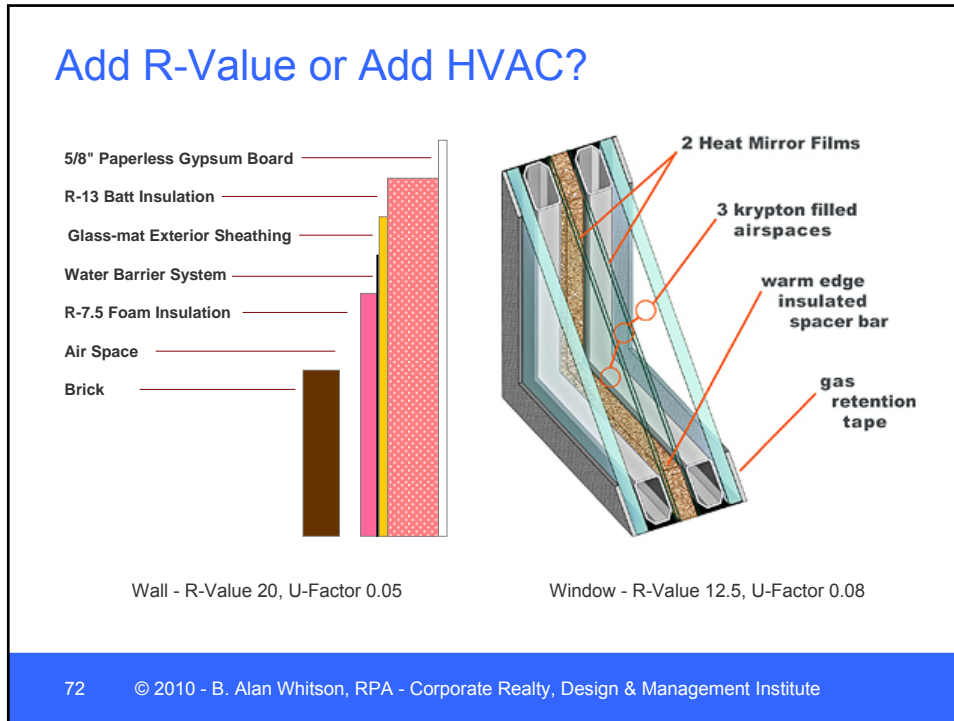
Performance Considerations - Glazing

- Number and size of windows in health care facilities is rising
- Reason:
 - Evidence based design
 - Positive impact on workers
- Downside:
 - Increased first cost of HVAC equipment
 - Increased energy cost
 - Electricity
 - Natural gas



Johns Hopkins Broadway Research Center

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78% Reduction in Exterior HVAC Load

	Winter 24°F exterior 70°F interior	Summer 99°F exterior 75°F interior	
Average Performance			
Wall (R-6.96 / U-1.14)	460,355 Btu	240,185 Btu	20 Tons
Window (R-1.96 / U-0.51)	815,212 Btu	425,328 Btu	35 Tons
Total	1,275,567 Btu	665,513 Btu	55 Tons
High Performance			
Wall (R-20 / U-0.05)	159,355 Btu	83,398 Btu	7 Tons
Window (R-12.5 / U-0.08)	127,876 Btu	66,718 Btu	6 Tons
Total	287,231 Btu	150,116 Btu	13 Tons

U Value × ΔT °F × Sq Ft of Area

69,498 Sq Ft Walls
 34,749 Sq Ft Windows

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Roofing

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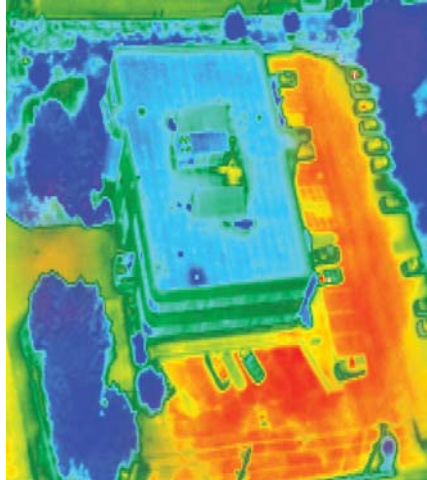
Cool Roofs Save Money

- Half of US population lives or works in a heat island
Dark roofs cause 38% of heat island effect
- On a Sunny Day 95° F
Dark Roof 180° F
White Roof 110° F
- Energy Star Roof Criteria
≥ 65% Initial Reflectance
≥ 50% Reflectivity after 3-yrs.



Georgia Tech – Atlanta, GA

Cool Roofs Save Money



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Annual Energy Savings from Cool Roof

Office/Lab Building - 34,000 Sq. Ft.

Atlanta, GA	\$4,250
Baltimore, MD	\$3,320
Boston, MA	\$2,074
Charlotte, NC	\$4,046
Chicago, IL	\$2,312
Columbus, OH	\$2,346
Detroit, MI	\$1,802
Las Vegas, NV	\$6,052
Long Beach, CA	\$3,264
Sacramento, CA	\$3,672



Source: DOE - ORNL - Cool Roof Calculator

Stanford University School of Medicine - Palo Alto, CA

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Green Roofing

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Why Green Roofs?

- Manage storm water
- Reduce heat island effect
- Purify water and air
- Reduce glare from lower level roofs
- Improve view of lower level roof tops from upper levels
- Intensive green roofs can be used to create a place of respite on difficult sites



OSHU Portland, OR

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St. Louis Children Hospital, St Louis, MO



St. Louis Children Hospital, St Louis, MO

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HVAC & IAQ

Case Study: Displacement Ventilation

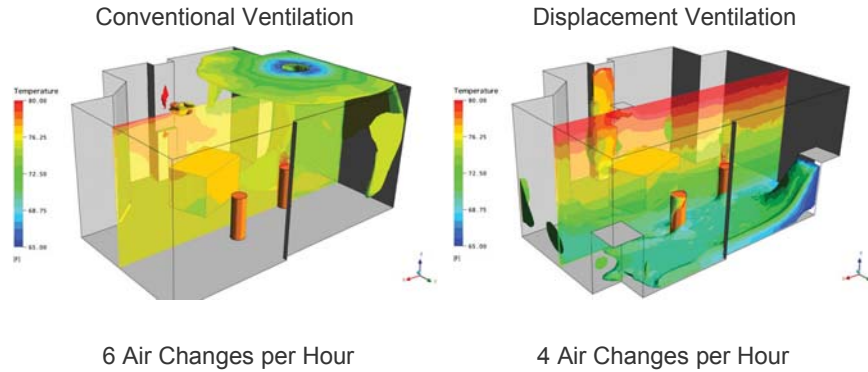
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Displacement Ventilation Patient Rooms

- Condition air is introduced by low sidewall vents
 - Supply Air 65 - 67° F & Face Velocity 30 - 35 FPM
- Particle movement with displacement ventilation moves in distinct “piston effect” versus completely random particle movement found in traditional overhead HVAC system with “well mixed room”
- Four air changes per hour versus six air changes per hour

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Better Infection Control Less Energy Cost



Kaiser Permanente Template Hospital - Modesto, CA

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Things to Know

- Air Supply located on footwall
- Air Return located above patient head
- Bathroom Air Transfer Grill should be located above bathroom door
- Manage solar heat gain
- Healthcare Facility Guidelines & ASHRAE



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Indoor Air Quality, Mold & Money

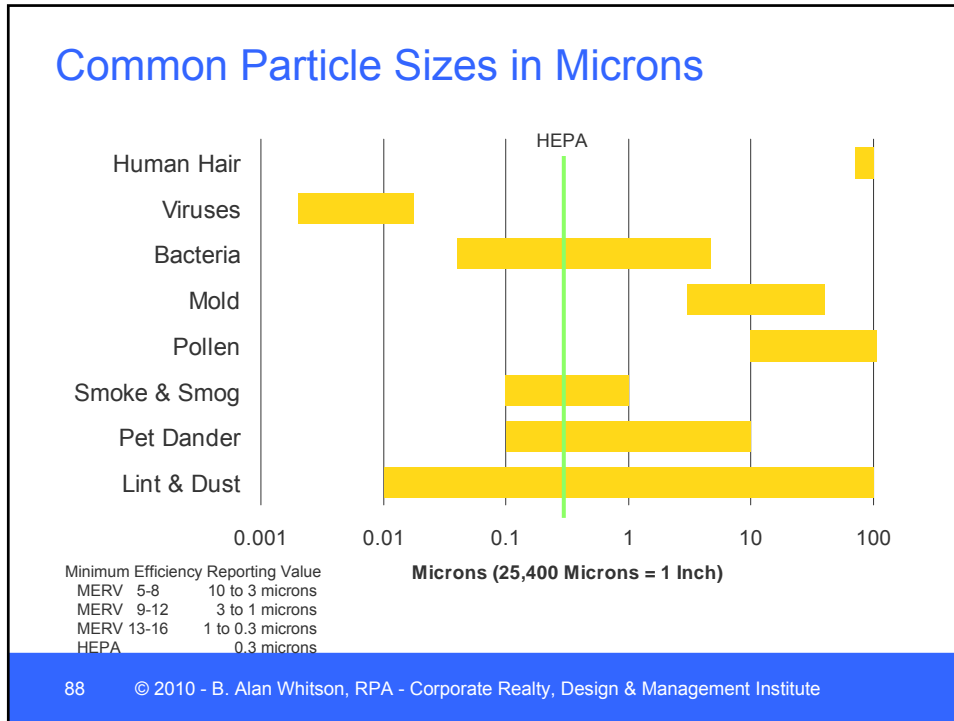
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Dust & Microbial Contamination

- GSA Study of VA Hospitals
 - 70% Airborne, 63% Not visible to human eye
 - 100 Microns of dust on coil cuts cooling capacity 10%
 - 20-30% increase in annual energy costs
- Air Filters
 - Use pre-filters to extend the life of high cost filters
 - MERV 8 / MERV 14 / HEPA
 - 10mm gap cuts performance of MERV 15 to MERV 8



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Ultraviolet Germicidal Irradiation

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Ultraviolet Germicidal Irradiation - UVGI

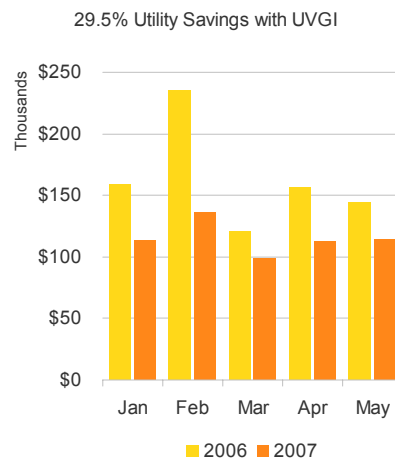
- Controls fungi in HVAC systems to reduce or eliminate mold-related allergies
- Prevents the development of Legionella and other bacteria ... a recognized control strategy for tuberculosis
- Predictably reduces the spread of cold and flu viruses and other airborne-transmitted diseases



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Financial Side of UVGI

- Eliminates & prevents bio-film build up on coils
- Improves heat transfer, increasing net cooling
 - Before UVGI
Chilled water in 43° - out 64°
 - After UVGI
Chilled water in 43° - out 53°
- Condensate water can be recovered and used as makeup water




Rio Grande Regional Hospital - McAllen, TX

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Mold

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Mold is the New Asbestos

- Mold requires four things:
 - Spores
 - Water
 - Temperature
 - Food
- Risk Management Strategy
 - Eliminate every possible way that moisture can enter building and accumulate to damaging levels
 - Eliminate sources of food

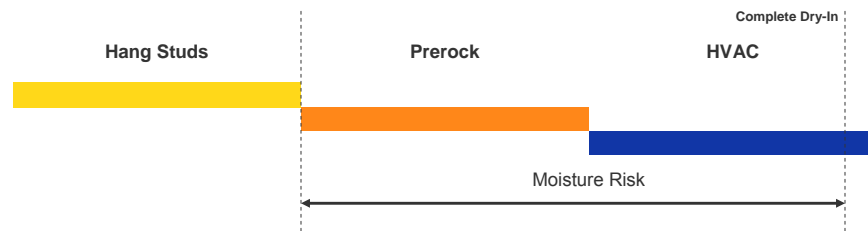


Memnoniella Echinata

Drywall, Mold & Risk

Managing Moisture Risk

- Install drywall “Tops” or “Prerock” must be done before many MEP trade activities can start, often prior “Dry-In”
- The traditional method is to gamble on the weather, this approach puts a disproportionate amount of long term risk on the owner with little benefit



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Construction Benefits of Early Drywall Install

- Accelerates Other Trades
 - M, E & P
 - Shafts & Stairwells
 - Wall Related Details
- Cuts Construction Period
 - Cuts General Conditions
 - Construction Interest Costs
 - Faster Income Generation
- Downside Risk = Rain
 - Moisture Damage & Mold
 - Post Dry-In Remediation
 - Higher Construction Cost



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Sunny with a 10% Chance of Rain...



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Economic Value of Paperless Drywall

- Paperless Drywall Avoids
 - Moisture Damage & Mold
 - Post Dry-In Remediation
 - Construction Delay
- Speeds Construction
 - Trims General Conditions
 - Reduces Construction Interest Expense
 - Accelerates Income Stream
- Protects Patient Health
 - Future Mold Issues



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Paper Napkin Analysis...

Accelerating Hospital Cash Flow	
Number Beds	163
Net Margin per Bed	\$30,809
Net Margin - Annualized	\$5,021,867
Finished Early – 4 Months	33.3%
	\$1,672,282
Adjust for Operational Ramp Up	50%
Value to Hospital of Early Drywall Start	\$836,141

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Case Study:
Medical University
South Carolina

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MUSC – Charleston, SC



MUSC – Charleston, SC

- Four Severe Storms During Construction
- No Mold
- No Remediation
- Reduced Construction Schedule Four Months
- Saved \$1,000,000 In Construction Related Costs

Resilient Flooring

Resilient Flooring

- System Service Life
 - University of Florida Study
 - Linoleum 30-years
 - Vinyl 15-years
 - Rubber 10-years
- Hygiene & IAQ Benefits
 - Antistatic
 - Antimicrobial
 - MSRA
 - Green Cleaning Programs
 - CHPS Guidelines (Sec 1350)
- Financial Benefits



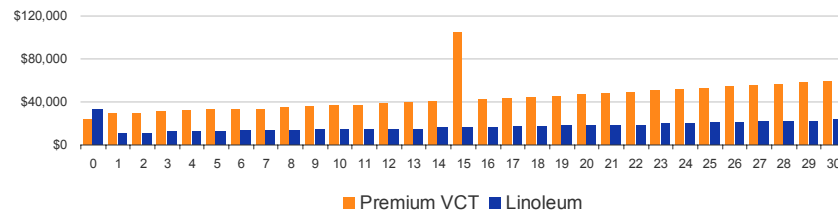
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Case Study: Linoleum vs. VCT

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30-Year Life Cycle Cost Analysis

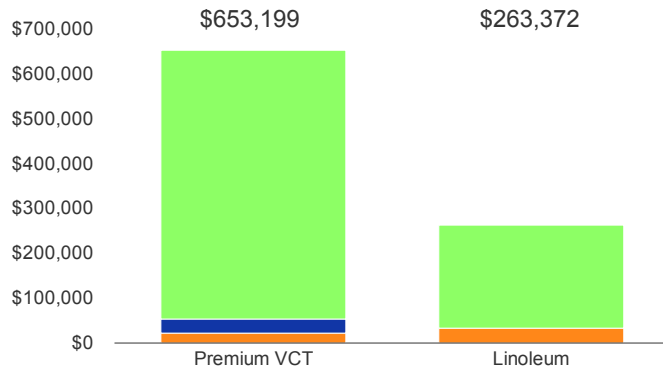
10,000 Sq Ft	Premium VCT	Linoleum	Difference
Installed Costs	\$2.04	\$3.27	+ \$1.23
Occupancy Ready	\$2.34	\$3.28	+ \$0.94
Maintenance Costs/Year	\$2.91	\$1.12	- \$1.79
Service Life	15-Years	30-Years	+ 15-Years
Total Cost of Ownership	\$1,364,839	\$524,510	+ \$840,329



2.5% Inflation (Break-Even Point 6.3 Months)

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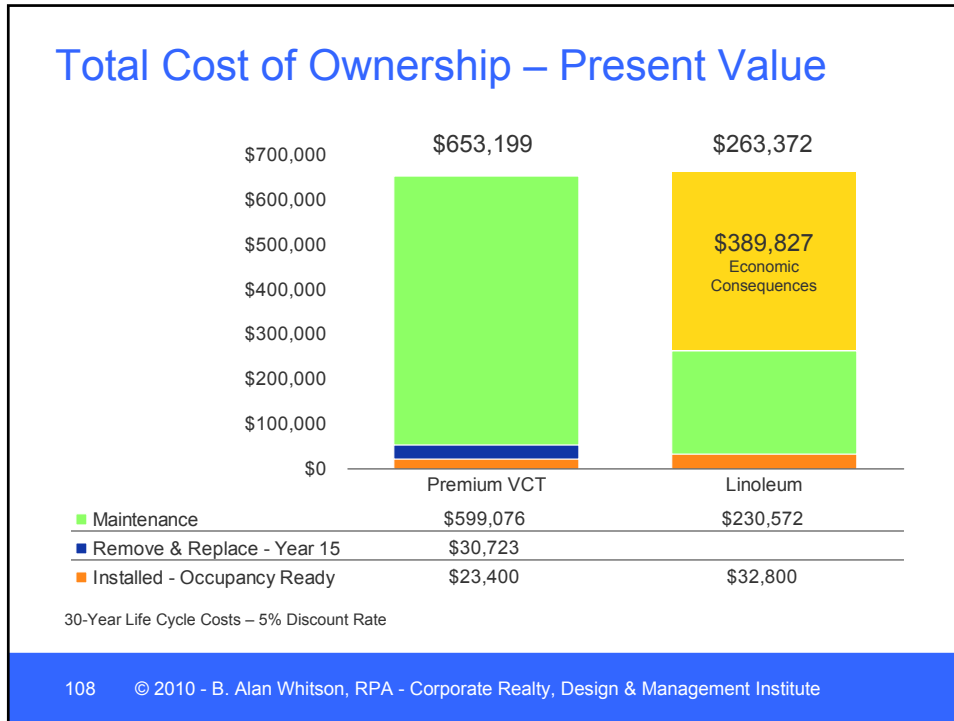
Total Cost of Ownership – Present Value



Maintenance	\$599,076	\$230,572
Remove & Replace - Year 15	\$30,723	
Installed - Occupancy Ready	\$23,400	\$32,800

30-Year Life Cycle Costs – 5% Discount Rate

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The List

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The List

- Integrated Design Team
 - Include Local Utility
- BIM
- Big Room for Detailers
 - Coordinate While Modeling
 - Shared server allows for real-time shared drawings
- Project Financial Analysts
 - Independent
 - Define Financial Metrics
 - Life Cycle Cost Analyses



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The List

- Building Orientation
 - Architecture 101
- Optimize Structural System
 - Staggered Steel Truss
- Energy Star Cool Roof
- Green Roofs
- Exterior Walls & Glazing
 - Air & Moisture Control
 - Wall Insulation R-20
 - Low-E Glass & R-12.5



Dell Children's Hospital – Austin, TX

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The List

- Sustainable Landscaping
 - Native Plants
 - Drip Irrigation
 - Minimize Pesticides
 - Compost Trimmings
- Permeable Paving
- Bio Swales
- Low Glare Exterior Lighting
 - Time Clocks
 - High CRI



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The List

- Single Patient Rooms
 - Variable Acuity Rooms
 - Large Windows w/ View
 - Large Bathroom Doors
 - Patient Lift
 - In Room Hand Washing
- In Room Storage
 - Patient's Personal Effects
 - Medical Supplies
- Satellite Nursing Stations
- Bar Code Point of Contact, Physician Order Entry



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The List

- Consultation Spaces & Family Lounge on Floor
- Patient Education Center
- Art, Music & Healing Gardens
- Staff Support Facilities
 - Staff Lounge on Floor
 - Daycare
 - Exercise Facilities
- Zipcar – Car Sharing Facility



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The List

- Lighting
 - High CRI ≥ 85 & 5000K
 - Task Ambient Lighting
 - Day Lighting
 - Dimming Ballast
 - Tune Lighting Level
 - Bedside Controls
 - Lights
 - Window
 - Occupancy Sensors
 - Time Clock & Scene Controls



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The List

- Electrical System
 - Combined Heat & Power
 - Hybrid UPS (Static & Rotary)
 - Bypass ATS (PM & Repair)
 - Harmonic Canceling Transformers
- Building Management System
 - Sub-Metering
- Integrated Building Security
 - Video



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The List

- HVAC & Indoor Air Quality
 - Displacement Ventilation
 - Thermal Energy Storage
 - Low IPLV Chiller
 - Variable Speed Drives
 - Premium Efficiency Motors
 - Fan Wall
 - Desiccant wheel in series w/ cooling coil
 - Economizers & Energy Recovery
 - High Performance Filters
 - UVGI



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The List

- Plumbing
 - Low Flow Plumbing Fixtures
 - Waterless Urinals
 - No Touch Controls
 - Rain & Gray Water Recovery
 - Equipment Cooling Loop
 - Cooling Tower
 - Ozone Water Treatment
 - Laundry
 - Ozone Water Treatment
 - Micro Filtration
 - Flexible Head Sprinklers



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The List

- Paperless Drywall
- Interior Finishes
 - Durability First
 - Is it Cleanable
 - Low VOC
- Think Modular
 - Plug & Play
- Carpet Tiles
- Acoustics & Speech Privacy
 - High Performance Ceiling
 - Sound Masking



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The List

- Green Cleaning
 - Health & Safety is # 1
 - Clean First – Then Disinfect
- Green Pest Management
- Recycling
 - Make It Easy to Recycle
 - Sort Waste at Source
- Remanufacturing
 - One Time Use Products
- Composting Food Waste



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Survey Results:

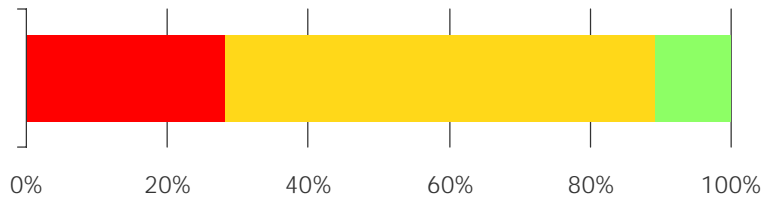
Twelve Questions

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Question # 1

- Where do you project the highest demand for future healthcare facilities?

- Acute care
- Outpatient services
- Assisted living

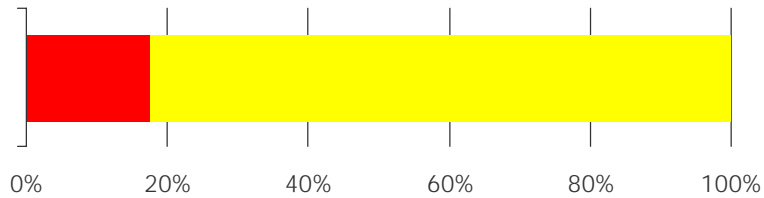


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Question # 2

- How high do you think energy costs will rise in the next year?

- 1 to 3%
- 4 to 6%
- 7% or Higher

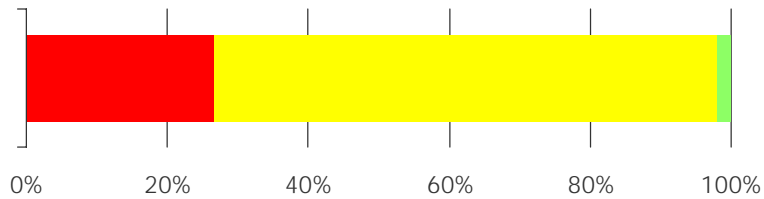


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Question # 3

- Every dollar average hospital saves on energy is equivalent to generating how much revenue?

- \$1
- \$10
- \$25

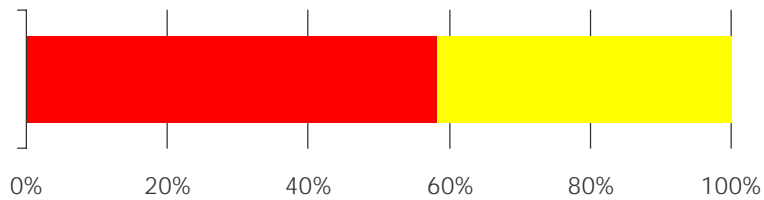


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Question # 4

- Saving \$1 per sq. ft. a year is equivalent to how much revenue for the average size hospital?

- \$1 million
- \$7 million
- \$12 million

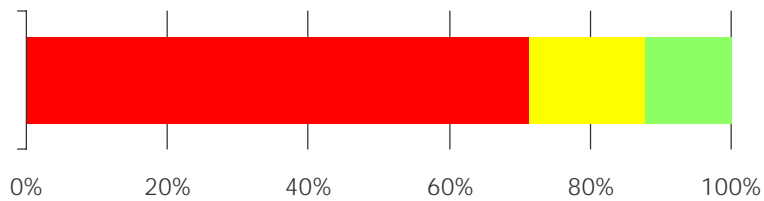


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Question # 5

- What concerns you the most about installing or specifying new energy saving technology?

- Will become quickly outdated
- Reliability
- May not deliver projected performance

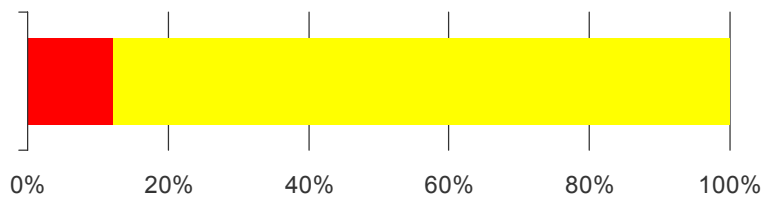


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Question # 6

- Which of these issues do you worry about the most in the operations of your facility?

- Management of utilities
- Reliability of infrastructure
- Regulatory pressure

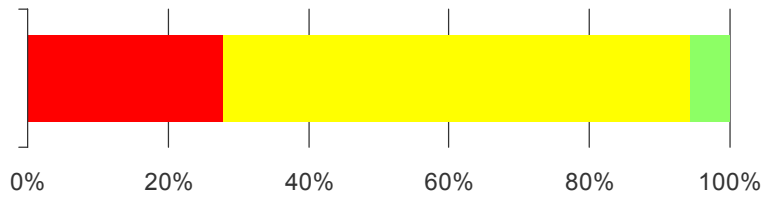


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Question # 7

- Compared to other industries, how effective is healthcare in implementing sustainable solutions?

- Better
- Same
- Worse

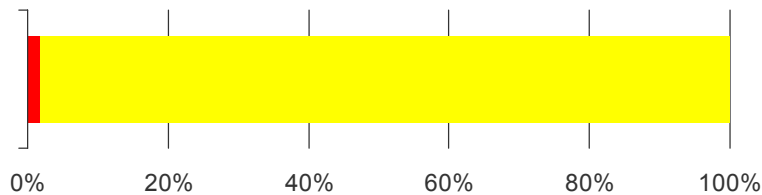


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Question # 8

- What took precedence in the final selection on equipment and materials on your last project?

- Durability or expected life of the item
- Initial cost
- Sustainable features

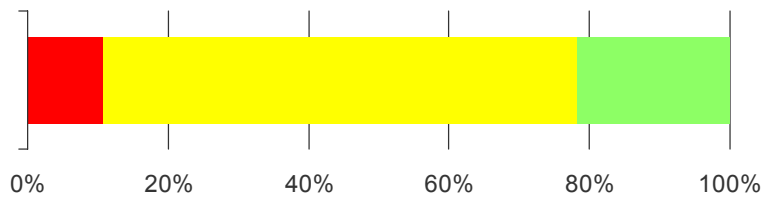


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Question # 9

- To retool a hospital for sustainability, what do you think is the most important next step?

- Create a Sustainability Steering Committee
- Designate a person as the sustainability manager
- Obtain building certification such as Energy Star or LEED

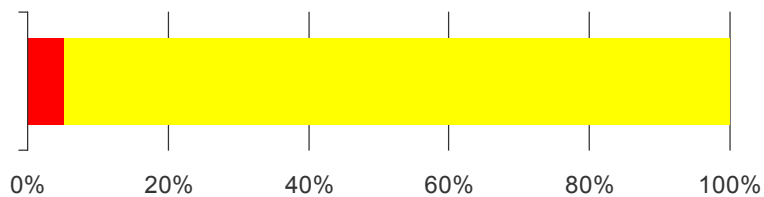


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Question # 10

- How prevalent do you think green-washing is today among manufacturers and suppliers?

- Less prevalent than 2 years ago
- More prevalent than 2 years ago
- No change over the past 2 years

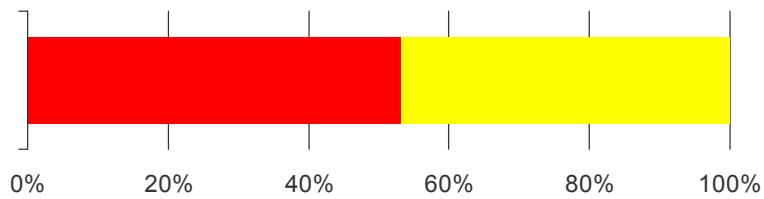


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Question # 11

- Do you employ evidence based design on your projects?

- Rarely or Never
- Occasionally
- Almost Always or Always

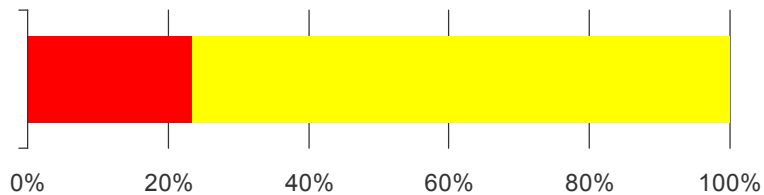


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Question # 12

- Do you research scientific sources prior to selecting products or equipment?

- Rarely or Never
- Occasionally
- Almost Always or Always



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St. Louis Healthcare Resource List

Lighting

Philips Lighting
Roy Balder
224-343-3704
roy.balder@philips.com
www.philipslighting.com

Interior Finish/Paperless Drywall

Georgia Pacific
Dave Brewster, 404-652-3188
debrewst@gapac.com
Warren Barber, 404-652-3146
wbarber@gapac.com
www.gpgypsum.com

Energy Mgmt/Intelligent Facilities Solutions

Schneider Electric
Stacey Longest
615-545-4744, stacey.longest@us.schneider-electric.com
Patrick Lepski
314-378-9076, patrick.lepski@us.schneider-electric.com
www.schneider-electric.com

Flooring

Forbo Flooring
Ron Dodson
636-978-0412
ronald.dodson@forbo.com
www.forbo.com

Roofing & Waterproofing Systems

Tremco
Beth Edwards
843-832-4749, bedwards@tremcoinc.com
John Breidenbach
847-343-8845, jbreidenbach@tremcoinc.com
www.tremcoinc.com

Window & Wall Systems

Wausau Window & Wall Systems
Lisa May
715-846-3474
lmay@wausauwindow.com
www.wausauwindow.coms

Guest Panelists

Donald Wojtkowski, SSM Healthcare
314-989-2109, donald_wojtkowski@ssmhc.com
Anne Hill, Murphy Company
314-997-6600, ahill@murphy-stl.com
Tim Koenig, Heideman Associates
314-822-2217, takoenig@zakcompanies.com

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