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Energy And Life Safety Costs

Healthy Schools Seminar

ASHRAE/IIT/College of DuPage

“Building Projects that Pay for Themselves”

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Energy Cost Trends

- *Electricity Higher, Short Term:* Association of Energy Engineers Market Survey 2004
 - • 57% of respondent's electric rates had increased in the last year
 - • 91% said rates would be higher in next three years

Electricity Lower, Long-Term

- Residential customers price decline of 5% by 2013*

Source: Energy Information Administration, Annual Energy Outlook 2004
With Projections to 2025, <http://www.eia.doe.gov/oiaf/aeo/gas.html#ngsc>

Gas

Long-Term Trend Shows Increase

- *Current average cost/1k cubic feet, 2004: \$4-9.00**
- *Projected average increase, 2006-2025: \$0.54*

**CNG vehicles highest rate, wellhead gas lowest, other consumption sectors vary. All costs and projections are stated in 2002 constant dollars*

Source: Energy Information Administration, Annual Energy Outlook 2004

With Projections to 2025, <http://www.eia.doe.gov/oiaf/aeo/gas.html#ngsc>

Mold and Insurance

- 2003 insurance industry payments for home remediation exceeded \$1.3 billion*
- Many policies exclude coverage
- Mold cleanup costs in the millions have been experienced by districts across the U.S.**

- Source: <http://www.icecommerce.com/news/shownews.asp?newsid=120&newstype=1>
- ** *Misc. stories, moldhelp.org*

Cost-Saving Technologies

Big Projects:

- Overnight Power Use
(Ice Mounds, District Heating/Cooling)
- Geothermal
- New Power Plants
- LEED Certification/New Buildings

More Affordable Projects

Inside Building Envelope:

- HVAC Technologies
- Energy-Efficient
Lighting

Monetary Tools

- Tax-Exempt Finance
- Energy Services
Companies



Houston, Do We Have A
Problem?

Cost-Benefit Verification

Building Owner

Finance Sources

Contractors

Taxpayers

If Pharaoh Could Do It, So
Can We!

Energy Performance Contracts

1. Minimize Up-Front Costs To Customer
2. Detailed Facility Study
3. Guaranteed Savings

International Experience

- Over 20 years of use
- Common Practice in US, Canada, Europe, Australia, Asia
- Best Practices Guides Available

Significant Users:

US Government: \$5 Billion + of contracts, saving \$1 billion+/year

Canada: 5,500 buildings, 16% energy cost reduction

Contracting Process

1. Preliminary Walk-Through (Free)
2. Detailed Facility Study
3. Energy Services Contract
4. Associated Financing Arrangements
5. Do The Job, Verify Results

Problem Definition Stage

1. Define Your RFP	7. DFS RFP Defined
2. Issue RFP	8. Issue DFS RFP
3. Evaluate Responses	9. Evaluate Responses
4. Interview Qualifiers	10. Negotiate Contract
5. Walkthroughs	11. Award Contract
6. Savings Target ID	12. Conduct DFS

DFS Request For Proposals

1. ID Cost Savings Possible
2. Define The Scope of Work For Savings Projects
3. Define Costs and Benefits of Savings Projects
4. Define Benefit Measurement Process

DFS Payment Options

- (a) Customer pays for DFS, or
- (b) DFS Cost Included In Capital Cost of Energy Savings Project

Usual Payment Rate: Market Value Of Services



Project Selection

DFS Deliverables

1. Maximum Project Costs
2. Total Identified Potential Energy Savings
3. Internal Rate of Return Of Identified Projects

Payback Period IRR

Payback Period (Years)	Internal Rate of Return
2	40%
3	25%
4	19%
7	10%

Is There A Benefit Here?



Defining Energy Savings

Engineering:

1. Measure energy use before and after projects
2. ID excess savings, or failure to meet targets

Legal:

1. Energy Performance Contract
2. ESC Paid From Savings
3. Customer paid if ESC fails to meet targets

International Performance Verification and Measurement Protocol

- Option A: Physical Assessment: ID Equipment Changes, Annual Equipment Performance and Operations Audit (1-5% of construction cost)
- Option B: Savings Calculation from Monitoring Data (3-10% of construction cost)
- Option C: Whole Building/Submeter Utility Charges (1-10% of construction cost)
- Option D: Energy Use Models, Calibrated By Hourly/Daily Utility Bills or End Use Monitoring (3-10% of construction cost)

Alternative Standards

- ASHRAE Guideline 14P
- Project and Customer-Specific
Measurement and Verification Protocol

MVP Elements

1. **Who is responsible** for measurement and verification
2. **How to determine:** baseline energy consumption, actual energy consumption, estimated energy savings, guaranteed energy savings, and allowable adjustment factors (e.g. changed hours of occupancy)
3. **What:** metering equipment, data collection process
4. **Quality Control:** How maintained over time, how repeatability confirmed
5. **Reports:** When required, what contents, who to provide, who to receive

Energy Services Contract: Operations Clauses

1. ID Energy Services Contractor, Customer
2. Energy savings projects design, installation
3. Project Management Process (Scope change, risk management, etc...)
4. Equipment Warranties, Maintenance Program

Energy Savings Contract: Risk & Payment Clauses

- Insurance & liability identification
- Intellectual Property rights
- Savings Guaranteed
- Payment Process (To Utility, Finance Sources, Energy Services Company, Or Customer (If Guarantee Not Met))
- Share Payments If Excess Savings Found?

Can We Afford This?

Texas Coast →



Financing Options

- Short-term loans or operating budget, for high payback projects
- Lease-purchase and other tax-exempt financing options, for larger projects/combined district project funds
- Energy Performance Contracts, To Reduce Risks and Eliminate Upfront Costs

Financing Example: Master Lease-Purchase (Tax-Exempt)

**Miami-Dade County Public Schools, 1988-
2002***

- Total amount financed \$ 9.5 million
- Investment per square foot \$3.80/sf
- Financing term 10 years
- Cost Savings Simple payback period 7.9 years
- Annual positive cash flow \$1.2 million
- Total benefit over term \$16.6 million

*Source: USEPA Energy Star Program Website

Current Financing Rates

- Ten Year Bonds: 3.85% to 3.65% (A rated, AAA rated, per fmsbonds.com, 11/30/04)
- Current Prime Bank Lending Rate: 5%
(Bankrate.com reporting WSJ information, 11/30/04)



So, where do we sign?

ABOUT THE PRESENTER

William A Price

William A. Price is an attorney at law and adjunct professor, high technology entrepreneurship for the Illinois Institute of Technology. His business law and high technology entrepreneurship classes have taught graduate students in Computer Science, Business, and Law how to Source and negotiate venture and other finance for high technology and biotech deals.

Mr. Price has also been the faculty advisor for several award-winning student inter-professional research project teams which did work for the International Engineering Consortium, General Motors, and Motorola on topics including wireless and mobile commerce; voice markup languages; consumer extranets; project communications intranets; data access through wireless devices, and e-business design. He teaches courses in e-commerce and in general business law, including organizational design.

Private law clients have included organizations ranging from individual retail store owners to Fortune 50 companies, for business organization, successful legal briefs before the U.S. Supreme Court and other venues, and other negotiations. His defense work has appeared in *The National Interest*, in *El Conquistador*, and in various military history venues. He is a member of the board of the Midwest Entrepreneurs Forum, and a member of the Chicago Biotech Network.