

Energy Efficiency Investment – Highest/Safest Return

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- Low Risk Investment
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Energy Efficiency Investment – Highest/Safest Return

Introduction/Background

- Professional Engineer – 35 Years in Energy Field
- 15 Years Designing Nuclear and Fossil Fuel Power Plants/CHP Plants
- Founded Bluestone Energy Services 1990
 - Design/Build efficiency solutions for hospitals, colleges, businesses
 - Grew Bluestone into a national company and sold it in 2011
- Founded Fairbanks Energy Services in 2014
 - Same business as bluestone – retrofitting existing lighting, HVAC and controls for efficiency
 - Clients include Massachusetts General Hospital, MIT, Vertex Pharmaceuticals



Proven Investment

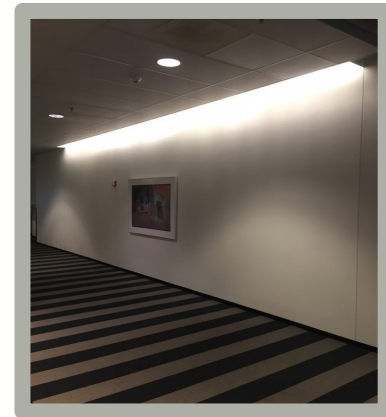
- **History - Green Revolving Funds**
 - Sustainable Endowments Institute
 - As of 2016, registered 62 participating institutions committing total of \$131 million
 - SEI reports average return on GRF investment is 28%
 - Harvard GRF – Started 2001
 - Invests \$12 million in energy efficiency annually
 - Investment saves \$4 million annually



Capture Lost Savings and High Utility Incentives

- **Lost Savings**

- Operating with inefficient lighting and equipment results in “Lost Savings” – higher payments to the utility
- Lost Savings capital is forever unavailable to the institution
- Capture the Lost Savings with a high yield endowment fund investment

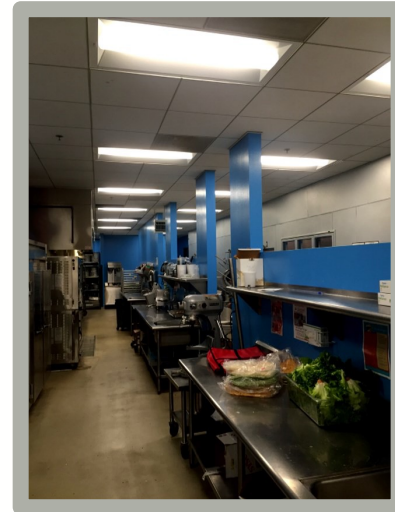


- **High Utility Incentives**

- Currently CT and MA utility incentives are at an all time high
- It won't be forever
- Capture the incentives before they diminish with a high yield endowment fund investment

Capture Lost Savings and High Utility Incentives

- **Endowment Fund Average Yield – 5-6%**
- **Efficiency Project Investment Yield - 15% to 25%**
 - Typical efficiency project simple payback after utility incentives - 2-3 years
 - Currently utility incentives pay 30% to 60% of project cost
 - Cost not covered by incentives can be an endowment fund shared savings investment at 15% - 25% ROI
 - Operating Budget would see average 25% to 30% energy cost savings over term of investment



Energy Efficiency – Endowment Fund Investment Opportunity

Capture Lost Savings and High Utility Incentives

Example: 2 Year Simple Payback after Utility Incentives

Project Installed Cost	\$ 1,000,000
Utility Incentives	\$ 400,000
Final College Cost/Endowment Fund Investment	\$ 600,000
Annual Savings	\$ 300,000



Year	1	2	3	4	5
Annual Savings	\$ 300,000	\$ 309,000	\$ 318,270	\$ 327,818	\$ 337,653
College Operating Budget Annual Payment to Endowment Fund (\$600,000 Financed Over 5 Years at 25%)	\$ 220,000	\$ 220,000	\$ 220,000	\$ 220,000	\$ 220,000
College Operating Budget Annual Cost Reduction	\$ 80,000	\$ 89,000	\$ 98,270	\$ 107,818	\$ 117,653

Energy Cost Escalating at 3%/Year

Energy Efficiency – Endowment Fund Investment Opportunity

Capture Lost Savings and High Utility Incentives

Example: 3 Year Simple Payback after Utility Incentives

Project Installed Cost	\$ 1,000,000
Utility Incentives	\$ 400,000
Final College Cost/Endowment Investment	\$ 600,000
Annual Savings	\$ 200,000



Year	1	2	3	4	5	6
Annual Savings	\$ 200,000	\$ 206,000	\$ 212,180	\$ 218,545	\$ 225,102	\$ 231,855
College Operating Budget Annual Payment to Endowment Fund						
(\$600,000 Financed Over 6 Years at 15%)	\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000	\$ 160,000
College Operating Budget Annual Cost Reduction	\$ 40,000	\$ 46,000	\$ 52,180	\$ 58,545	\$ 65,102	\$ 71,855

Energy Cost Escalating at 3%/Year

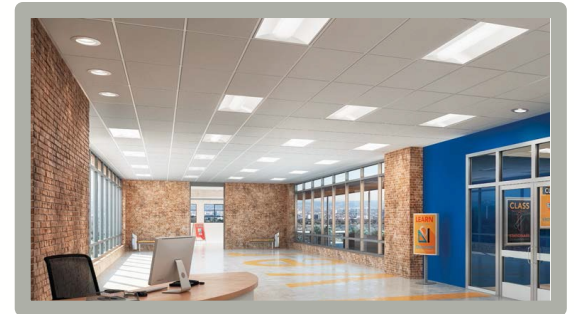
Capture Lost Savings and High Utility Incentives

- Case Study – Boston Area University
- Lighting Upgrade Program - \$21 million
- Current Investment- \$3.5 million/year – (\$2.5 million University /\$1 million utility incentives)
- 6 Years to complete lighting upgrade
- Energy savings is approximately 30% of installed cost
- After first year, university will have Lost Savings of $30\% \times \$17.5 \text{ million} = \5.25 million



Capture Lost Savings and High Utility Incentives

- Case Study – Boston Area University - Endowment Fund Investment
- Invest additional \$2.5 million with additional \$1 million of utility incentives for 3 years
- Total annual investment \$7 million
- 3 Years to complete lighting upgrade
- After first year, university will have Lost Savings of $30\% \times \$14 \text{ million} = \4.2 million



Energy Efficiency – Endowment Fund Investment Opportunity

Comparison Lighting Upgrade Plans – Boston Area University

Year	2017	2018	2019	2020	2021	2022	2023	Totals
Current Plan								
Annual Lighting Project Cost \$3.5 million								
University Payment	\$ (2.5)	\$ (2.5)	\$ (2.5)	\$ (2.5)	\$ (2.5)	\$ (2.5)		
Utility Incentive	\$ 1.0	\$ 1.0	\$ 1.0	\$ 1.0	\$ 1.0	\$ 1.0		
Lighting Left to Do	\$ 17.5	\$ 14.0	\$ 10.5	\$ 7.0	\$ 3.5	\$ -		
Captured Annual Savings (3% escalation)	\$ 1.05	\$ 2.13	\$ 3.25	\$ 4.39	\$ 5.57	\$ 6.79	\$ 7.00	\$ 30.2
Cash Flow (University Payment plus Annual Captured Savings)	\$ (1.45)	\$ (0.37)	\$ 0.75	\$ 1.89	\$ 3.07	\$ 4.29	\$ 7.00	\$ 15.2
Present Worth Cash Flow (6%)	(\$1.37)	(\$0.33)	\$0.63	\$1.50	\$2.30	\$3.03	\$4.65	\$ 10.4
Accelerated Plan								
Annual Lighting Project Cost \$7 million								
University Payment	\$ (2.5)	\$ (2.5)	\$ (2.5)					
Utility Incentive	\$ 2.0	\$ 2.0	\$ 2.0					
Endowment Fund Investment	\$ 2.5	\$ 2.5	\$ 2.5					
Lighting Left to Do	\$ 14	\$ 7	\$ -					
Captured Annual Savings (3% escalation)	\$ 2.10	\$ 4.26	\$ 6.49	\$ 6.69	\$ 6.89	\$ 7.09	\$ 7.31	\$ 40.8
Investment Return								
(3) Five Year Endowment loans of \$2.5M at 20% interest	(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)			
		(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)		
			(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)	(\$0.84)	
Cash Flow (University Payment plus Endowment Loan plus Captured Annual Savings)	\$ (1.24)	\$ 0.09	\$ 1.48	\$ 4.18	\$ 4.38	\$ 5.42	\$ 6.47	\$ 20.8
Present Worth Cash Flow (6%)	(\$1.17)	\$0.08	\$1.25	\$3.31	\$3.27	\$3.82	\$4.30	\$ 14.9

Safe Investment

- Utility has ownership role and provides 3rd party review
- Efficiency Solutions incentivized by utility are tried and true
 - No Black Boxes
- Efficiency Solution Provider Savings Guaranty – Measurement & Verification Plan
 - M&V mature discipline
- Energy Savings Insurance
 - 2-5% cost of savings value



Development of Energy Efficiency Program

- Option A: Typical College Construction Process
 - Obtain bids, select and contract with an engineering firm to audit systems and provide a report
 - Obtain bids, select and contract with a design engineering firm to provide plans and specifications
 - Obtain bids, select and contract with contractors to install the measures
 - Obtain bids, select and contract with a construction management firm
- Process will take a year before any energy is saved – (Lost Savings)
- Division of responsibility – no one entity is responsible for the overall project, project savings or the utility incentives and there is no guaranty of utility incentive or savings.
- Design engineering firms generally do not have expertise in providing cost effective efficiency upgrades to existing systems.

Development of Energy Efficiency Program

- Option B: Ramp Up College Facilities Department
 - The typical facilities department is understaffed, dealing with deferred maintenance, and trying to keep everything operating – energy efficiency is an afterthought.
 - Staff could be added for the energy initiative but at additional cost and the result would be an in-house version of Option A.

Development of Energy Efficiency Program

- Option C: Outsource the Process to an Energy Service Company, (ESCO)
 - ESCOs have expertise to identify, develop and implement efficiency solutions
 - ESCOs will guaranty utility incentives and savings
 - Operate on a shared savings basis over a multi-year term where the ESCO takes the majority of the savings, (80-90%)
 - ESCOs finance the efficiency solutions, capture the Lost Savings, and make a 20-25% ROI
 - No room for Endowment Fund investment

Development of Energy Efficiency Program

- Option D: Engage Efficiency Solution Provider, (ESP)
 - Provides all services of ESCO except financing:
 - Identifies, develops and implements efficiency solutions
 - Guarantees utility incentives and savings
 - What to look for in an ESP
 - Nimble, reputable company with expertise in all things efficiency
 - Politically adept- able to work with different college departments
 - Vendor and product agnostic – freedom to provide the best solutions
 - Provides turnkey one stop-shop service
 - Understands Lost Savings and will work expeditiously
 - Is willing to have “skin in the game” – conceptually develop projects and estimated economics at no cost so college can make informed decisions

Energy Efficiency – Endowment Fund Investment Opportunity

Recent Comprehensive Efficiency Development – 3 CT Hospitals

	Installed Cost (\$)	Energy Savings (\$)	Maintenance Savings (\$)	Total Savings (\$)	Estimated Utility Incentives (\$)	Hospital Cost (\$)	Simple Payback Years
TA (Mechanical Projects)	\$ 5,568,592	\$ 1,202,064		\$ 1,202,064	\$ 2,974,166	\$ 2,594,426	2.2
Phase 2 Lighting	\$ 3,403,000	\$ 499,735	\$ 59,767	\$ 559,502	\$ 1,434,776	\$ 1,968,224	3.5
Combined	\$ 8,971,592	\$ 1,701,799	\$ 59,767	\$ 1,761,566	\$ 4,408,942	\$ 4,562,650	2.6





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