Buildings in Alaska

What Worked, What Didn't

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Design Alaska

Thermal Envelope Upgrades

UAF Community and Technical College

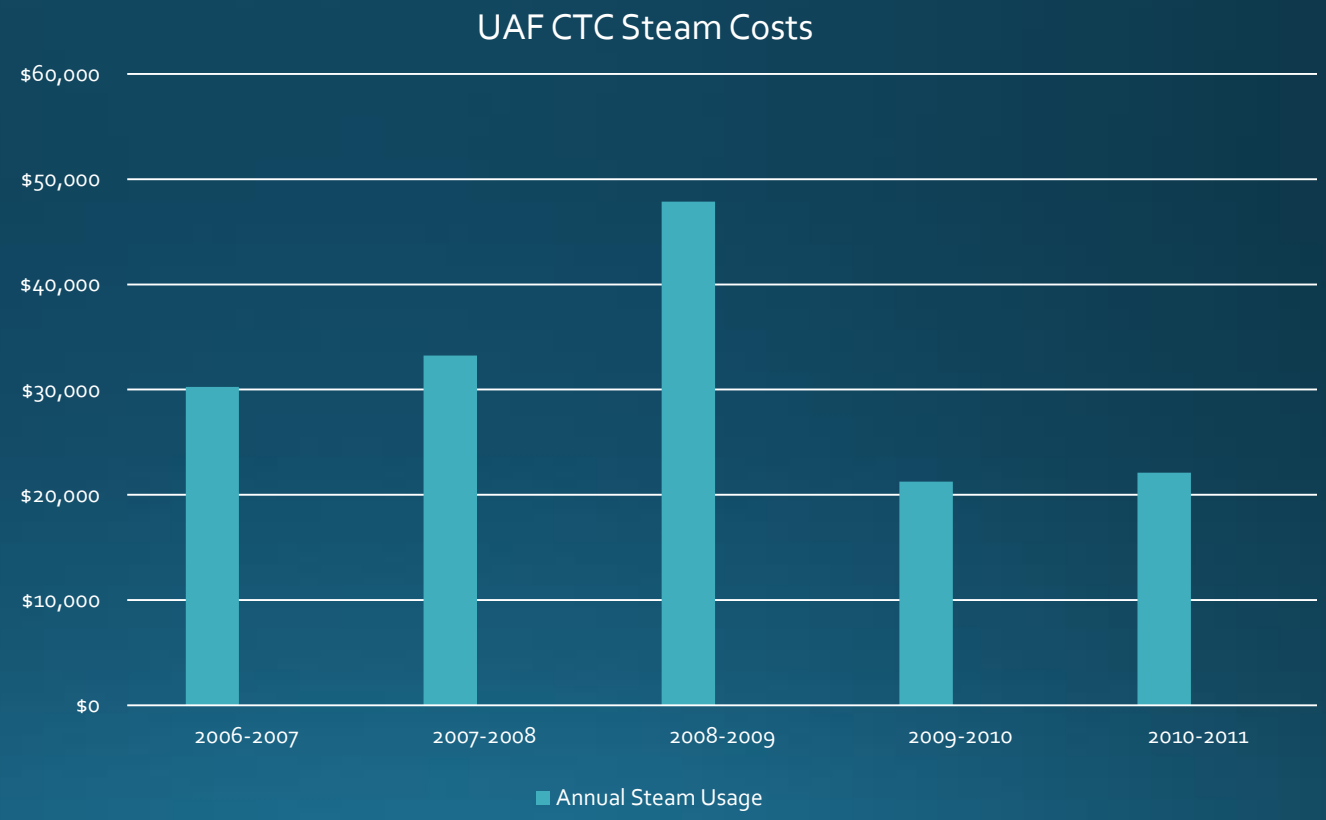
Pre-Retrofit R-Value – R-5 curtain wall
Post-Retrofit R-value – R-30

Thermal Envelope Upgrades

UAF Community and Technical College

Annual Savings - $10,000

Annual Savings with Ventilation - $16,000



Thermal Envelope Upgrades

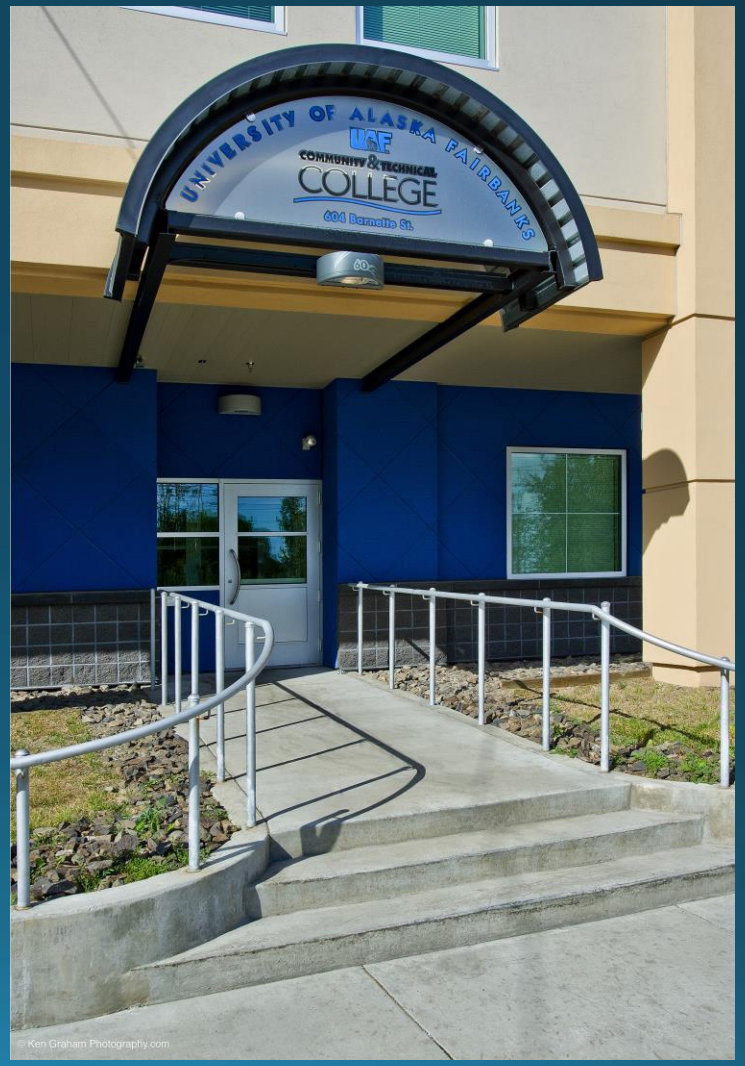
UAF Community and Technical College

Construction Costs - $5.8 Million

Simple Payback– 300 Years!

Need to take into account other factors

- Didn't look at just cost of energy upgrade
- Other owner requirements included



Thermal Envelope Upgrades

UAF Community and Technical College

Occupant Comfort
Code Ventilation
Professional Aesthetics

– PRICELESS!

Thermal Envelope Upgrades

Salcha Elementary School

Envelope Pre-Retrofit
Walls R-19 – R-38
Roof R-19 – R70

Thermal Envelope Upgrades

Salcha Elementary School

Envelope Post-Retrofit
Walls R- 30- R-46
Roof R- 76 – R-100

Thermal Envelope Upgrades

Salcha Elementary School

Energy Audit – NOT recommend Envelope improvements

Construction Cost - $875,000

The following measures were not found to be cost-effective:						
7	Above-Grade Wall: outbuilding walls	Install R-30 rigid foam board to exterior and cover with T1-11 siding or equivalent.	$819	$21,254	0.90	26
12	Exterior Door: Metal 1/2 Lite	Remove existing door and install standard pre-hung U-0.16 insulated door, including hardware.	$89	$3,756	0.55	42
13	Above-Grade Wall: Addition Walls	Install R-30 rigid foam board to exterior and cover with T1-11 siding or equivalent.	$631	$26,814	0.55	43
22	Above-Grade Wall: Addition Walls	Install R-30 rigid foam board to exterior and cover with T1-11 siding or equivalent.	$523	$52,712	0.23	100
23	Window/Skylight: Single Wood Storm	Replace existing window with U-0.30 vinyl window	$21	$1,597	0.22	78
25	Window/Skylight: Double Other Wood 1/4"	Replace existing window with U-0.30 vinyl window	$359	$28,934	0.21	81
26	Window/Skylight: Double South Woodl 1/4"	Replace existing window with U-0.30 vinyl window	$262	$21,972	0.21	84
27	Window/Skylight: Double South Wood 3/4"	Replace existing window with U-0.30 vinyl window	$76	$7,856	0.17	100
28	Window/Skylight: Triple Wood Other 1/4"	Replace existing window with U-0.30 vinyl window	$34	$4,889	0.12	140
29	Window/Skylight: Triple Wood 1/2 other	Replace existing window with U-0.30 vinyl window	$11	$2,411	0.08	220

Taken from the Salcha Elementary Energy Audit by Nortech

Thermal Envelope Upgrades

Salcha Elementary School

Envelope Repair Needed

Equipment Upgrades

Fairbanks Curling Club

Added a dry cooler for free cooling below 15 degrees F

Equipment Upgrades

Fairbanks Curling Club

Existing condenser system provides cooling below 15 degrees F

Equipment Upgrades

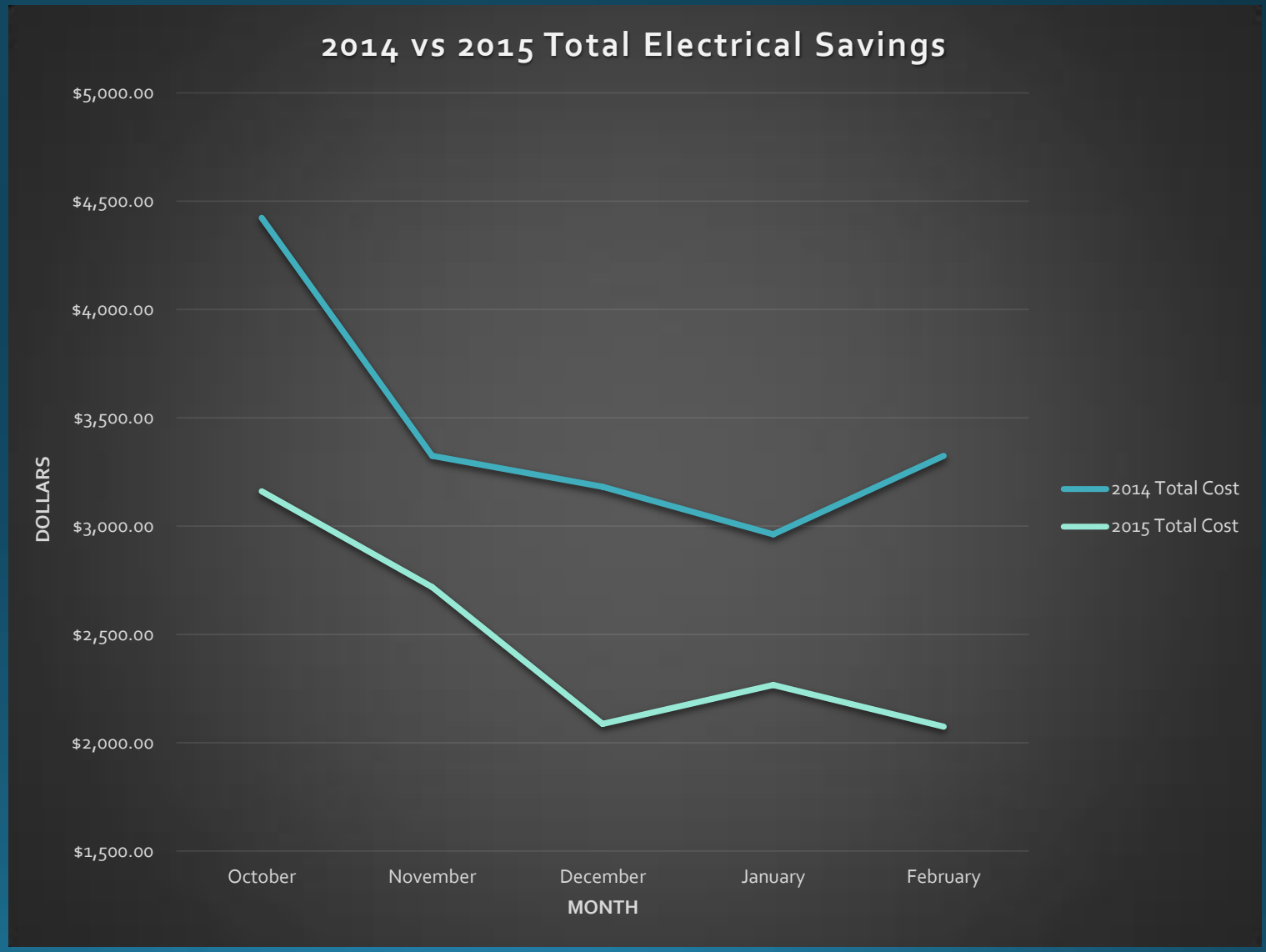
Fairbanks Curling Club

Approximate Energy Savings – $5,500/year

Construction costs - $100,000

Simple Payback– 18 years

Calculated Simple Payback – 10 years



Equipment Upgrades

Fairbanks Curling Club

Energy Savings Factors

- Demand Factor
- Mild Winter

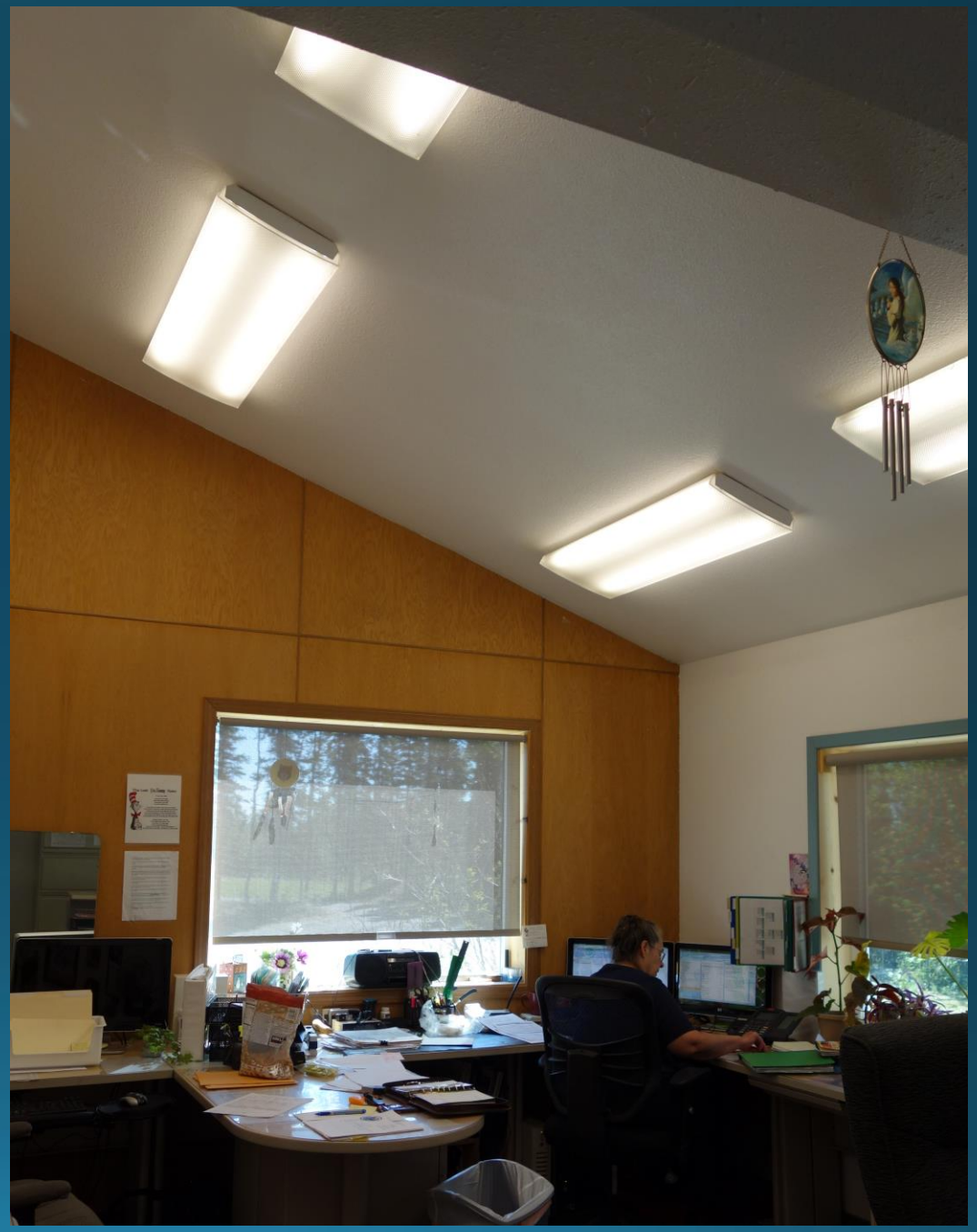
Other Factors

- Improved control
- Redundancy

Lighting Upgrades

Division of Forestry – Tok Office

Replaced T-12 lighting with LEDs and added occupancy sensors



Lighting Upgrades

Division of Forestry – Tok Office

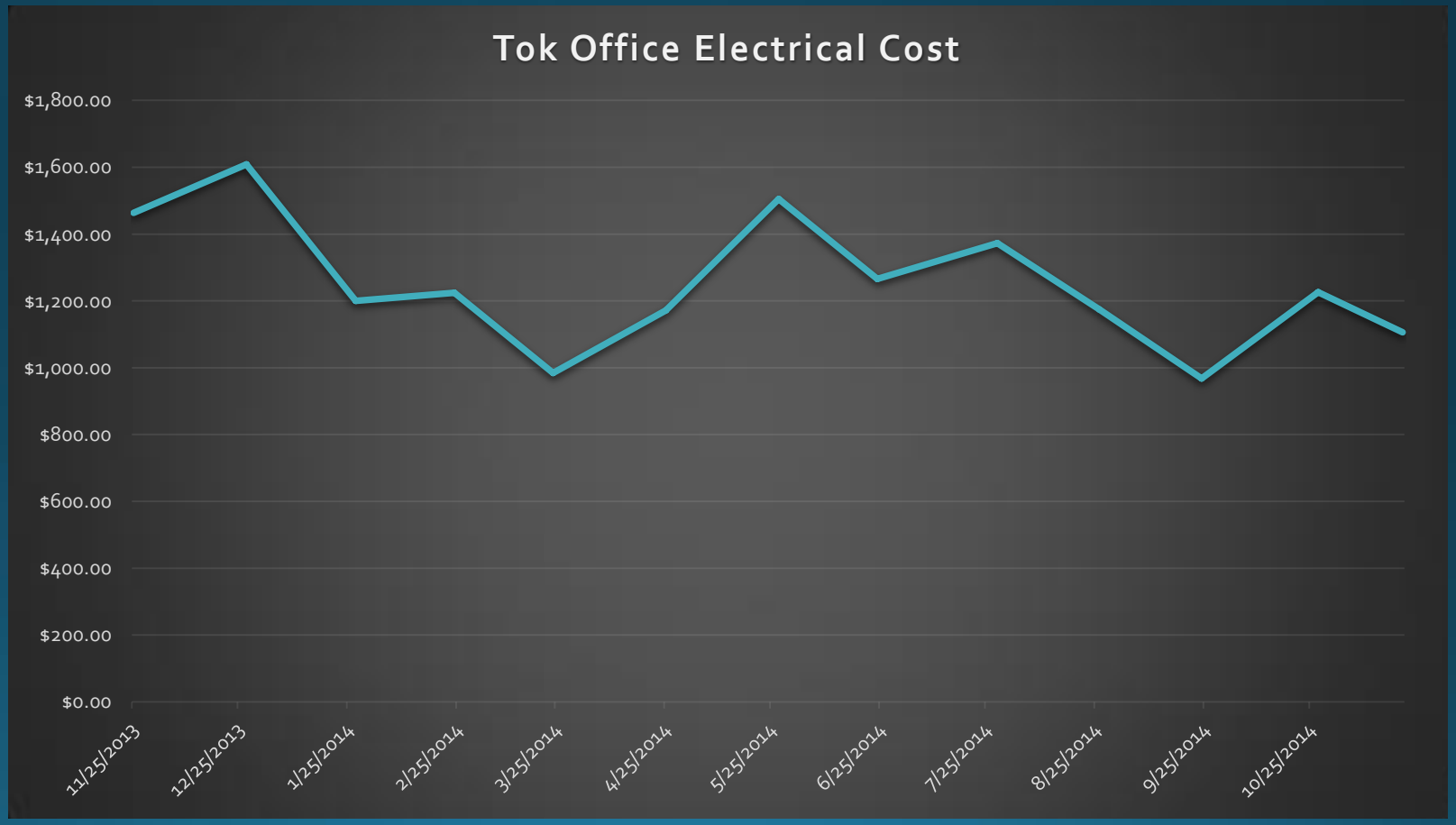
LED Retrofit Kit

Lighting Upgrades

Division of Forestry – Tok Office

Approximately $350/month savings (Limited Data)

Electricity costs – 0.53/KwH



Lighting Upgrades

Division of Forestry – Tok Office

Approximately annual savings:
$4,200

Construction Cost:
$72,000

Simple Payback: 17 years

Simple Payback with reduced Maintenance:
7 Years

Calculated Simple Payback:
4 years

Summary
Retrofit Projects

- Do Conduct an Energy Audit or Investigation
- Do Think about the Big Picture Before Renovation
- Do take Other Factors into account
- Do Track Energy and report back Results
- Don’t hesitate to do Low Hanging Fruit as part of Maintenance