Making Superhero Financial Decisions to Control Energy Costs

KSBA Annual Conference

February 25, 2017

ENERGY STAR AWARD 2016
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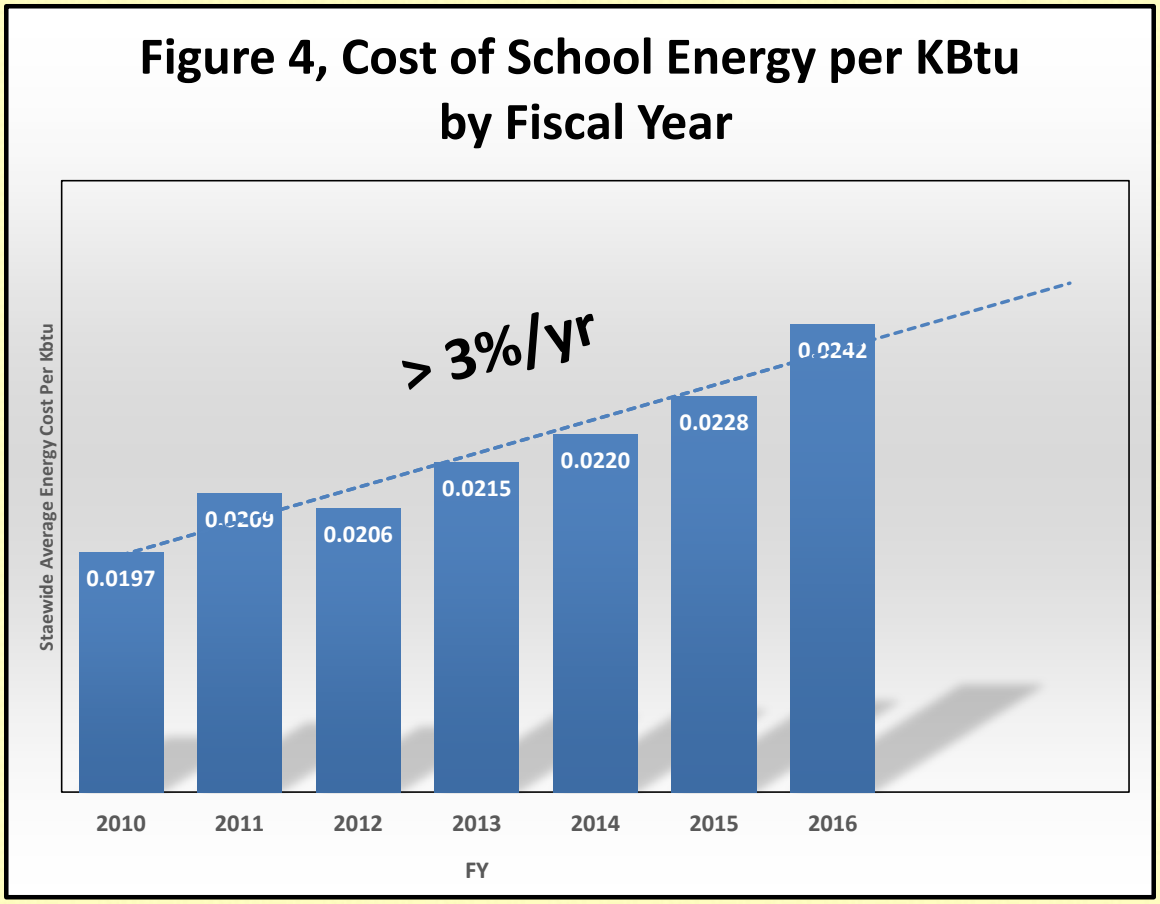
Outline

1. Why & How to BE a Hero
2. Utility Rate Overview
3. Managing Usage and Demand
4. Eliminate Waste Through Technology Upgrades
5. Paying for Upgrades
6. Financing Options

Why & How to Be a HERO

The Problem is Cost

Kentucky Energy Costs



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Wasted Energy = Money on the floor waiting to be picked up

How Utility Rates Influence Your Cost

Electric & Gas Rates

- Utility Rates = Pricing Signals
- Charges
    1. Basic Customer Charges
    2. Energy Charges – Daily Use
    3. Demand Charges – Maximum Use
    4. Adders
        1. Fuel
        2. Environmental
        3. Taxes

Typical Charges

Rate	Customer Charge	Energy Charge, $/kwh	Season	Demand Charge, $/KW	Time of Day
Residential Service	$ 10.75	$ 0.08870	All		
General Service	$ 40.00	$ 0.10426	All		
Commerical Power	$ 90.00	$ 0.03572	Summer	$ 19.05	
			Winter	$ 16.95	
Commerical Time of Day	$ 200.00	$ 0.03527	Summer	$ 6.13	All Hours
				$ 4.53	10AM - 10PM
				$ 5.20	1PM-7PM
			Winter	$ 6.13	All Hours
				$ 4.53	6AM-10PM
				$ 5.20	6AM - Noon

But…It's just math…

yet you have to know your **history** to get the right answer

Rate	Customer Charge	Energy Charge, $/kwh	Season	Demand Charge, $/KW	Time of Day	Annual cost
Residential Service	$ 10.75	$ 0.08870	All			-
General Service	$ 40.00	$ 0.10426	All			$ 156,870
Commercial Power	$ 90.00	$ 0.03572	Summer	$ 19.05		$ 144,675
			Winter	$ 16.95		
Commercial Time of Day	$ 200.00	$ 0.03527	Summer	$ 6.13	All Hours	$ 136,191
				$ 4.53	10AM - 10PM	
				$ 5.20	1PM-7PM	
			Winter	$ 6.13	All Hours	
				$ 4.53	6AM-10PM	
				$ 5.20	6AM - Noon	
Demand, KW	425					
Usage, KWH	1,500,000					

$90,000 in Demand

$81,000 in Demand

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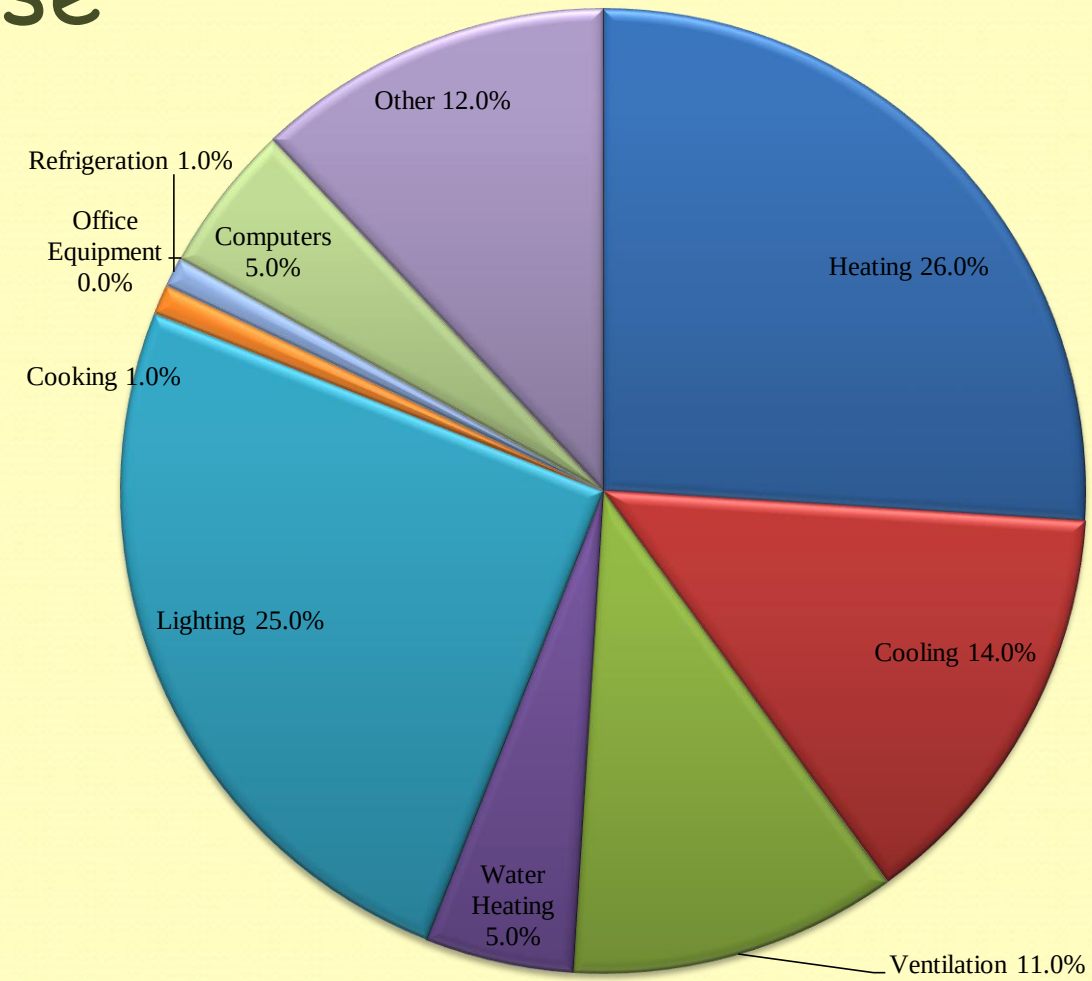
Manage Your Usage and Demand

Where do those BTUs Go?

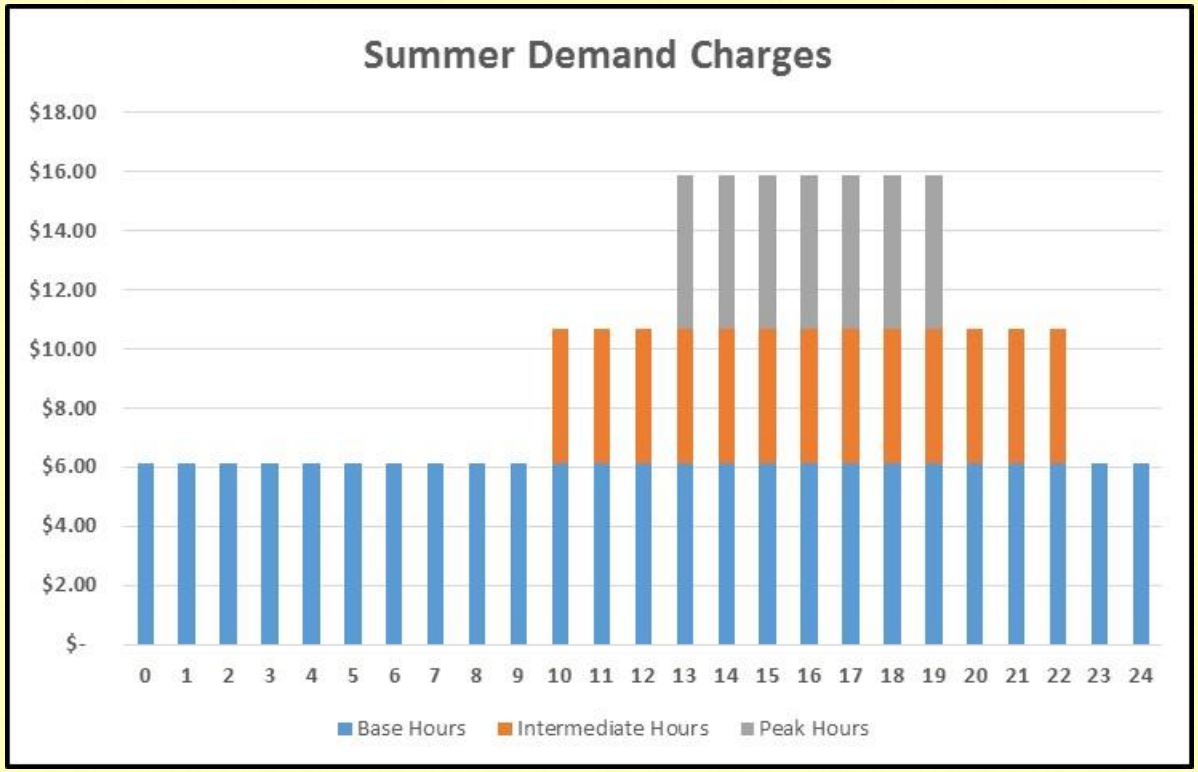
- Note HVAC
- Note Lighting
- Other = Things Plugged In
  - ✓ Space heaters
  - ✓ Coffee Makers
  - ✓ Microwaves
  - ✓ Mini Fridge



CBECS High School Energy Use Profile (2003)

•Commercial Building Energy Consumption Survey

Utility Load & Cost Curve



Enabling Energy Efficiency and DEMAND Response

- Real Time Metering (Smart)
- Equipment
  - Technical Upgrades -- Lighting
  - Technical Upgrades – Apps
  - Equipment Upgrades
    - Demand Response Chillers, etc.
    - Energy Storage
- Off Hours Energy Usage (take advantage of TOD)
  - Heating and Cooling
  - Cafeteria Cleanup

Managing Demand

End User

- Manage Startups
- Technology upgrades
  - Lights
  - Equipment

- Demand Limiting
- Demand Shedding
- Energy Management
- Reduce Baseline Load

Utility Company

- Demand Side Management Programs (DSM)
  - Rebates
    - Lights
    - Refrigerators
    - Equipment
  - Demand Limiting /Shedding Incentives
    - ENERNOC
  - Energy Manager Funding
  - Rates

Eliminate Waste Through Technology Upgrades

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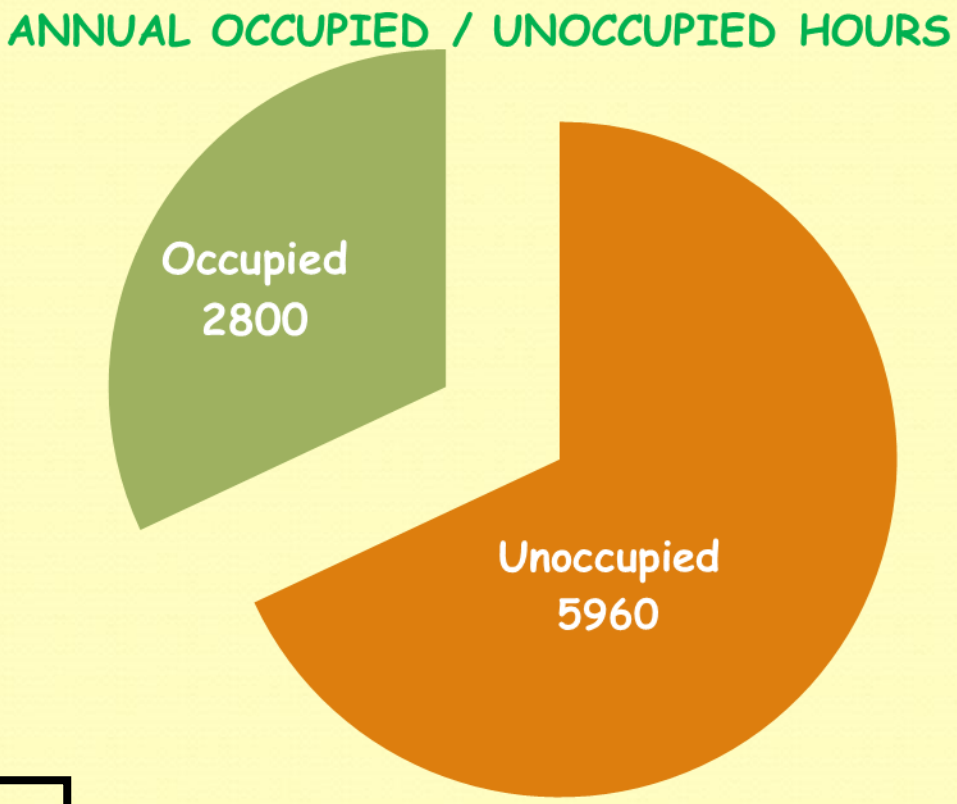
High Leverage Technology Changes

Why Have Setbacks in a School?



8760 hours/year

Paying for Upgrades

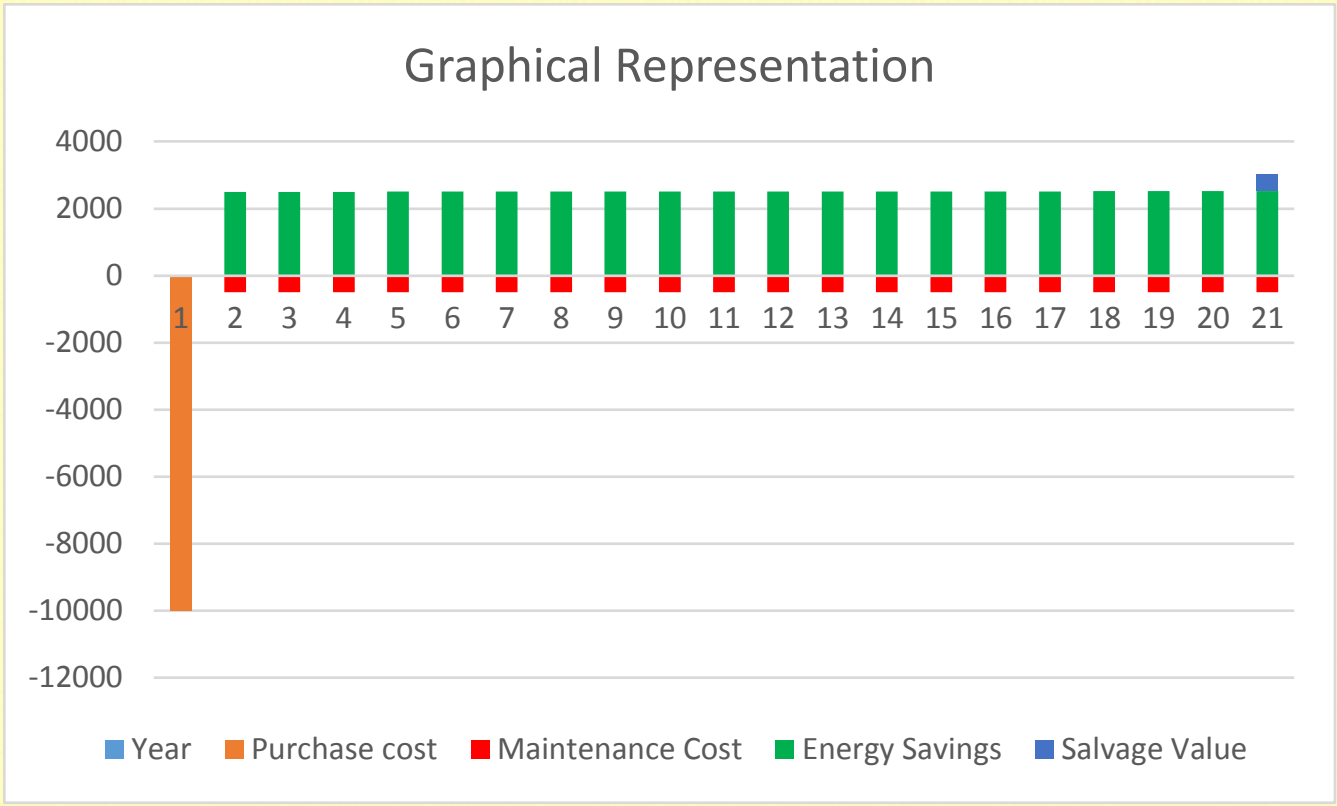
Terminology

- First Cost = ?
- Simple Payback = ?
- Cash Flow = ?
- Life Cycle = ?
- Present Value = ?
- Annuity = ?

Cash Flow Example

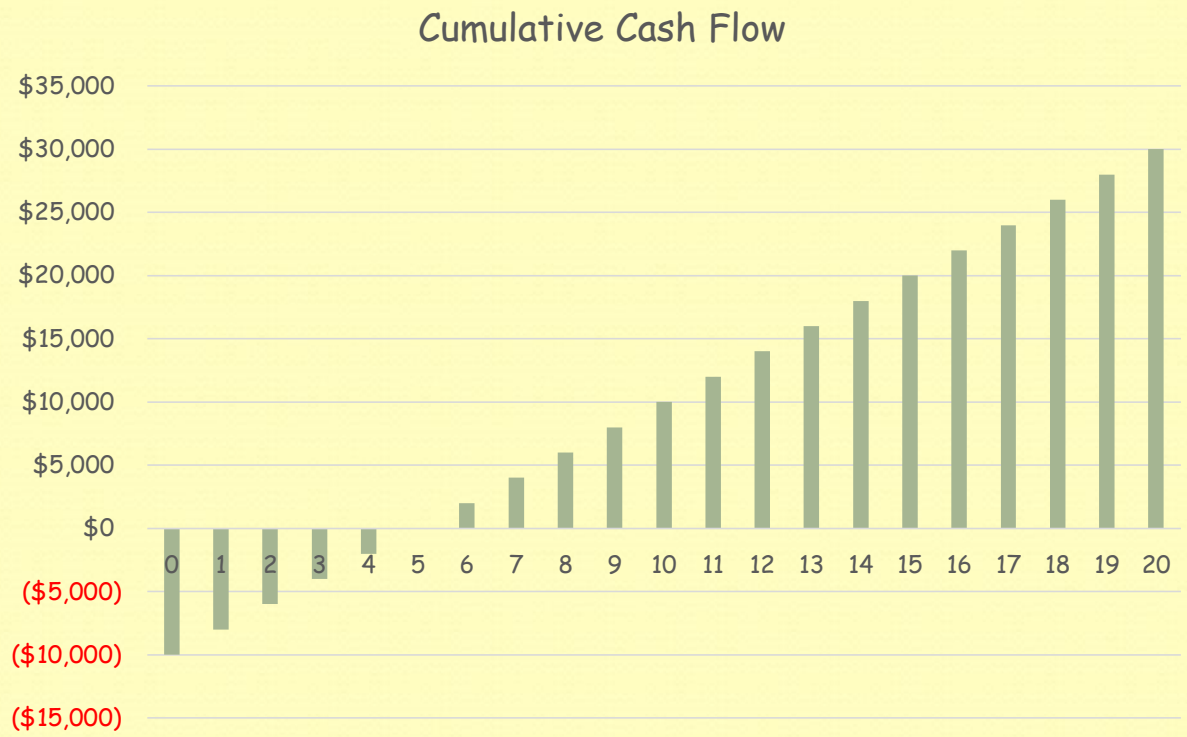
- Heat Pump costs $10,000
- Maintenance Cost is $500 / year
- Energy Savings are $2,500 / year for 20 Years
- Salvage Value at 20 years is $500

Cash Flow Example



Cash Flow Example

Simple Payback = Cost/Net Savings
= 5 years



Enter Time Value of Money

- Interest (Opportunity Cost)
- Inflation (Decreased Purchasing Power)
- Avoided Costs

Energy Management Expenditures are typically justified in terms of avoided costs. Expenses come at project start, savings & benefits occur later. We need to normalize all costs to today's standards to be able to compare.

And then comes Life Cycle Cost

- In 2010 KRS 157.455 -- "to calculate and compare different building designs to identify the best investment over the long term. Life-cycle costs include design and construction, operating costs, maintenance costs, and repair and replacement costs , adjusted by the time value of money.

- All federal facilities have mandated energy conservation goals and the criterion for assessing the effectiveness of those goals is minimization of Life Cycle Costs.

Operational Savings for Equipment Retrofits

Example:

- Your energy manager has identified an air infiltration problem in one of your buildings and estimates the savings will be $15,000 per year but will cost $45,000 to repair.
- You say, "No way, I've got to find $130,000 to repair a roof in another building."
- ?????

Operational Savings for Equipment Retrofits

Example:

- Assume the repaired building will last 20 years
- Assume 5% discount rate
- By understanding the Life Cycle Cost and the Time Value of Money, you can determine the Present Value of the $15,000 per year annuity over the next 20 years

Operational Savings for Equipment Retrofits

Example:

- $15,000 X 12.4622* = $186,933 (Present Value)
- $186,933 - $45,000 = $141,933 (Net Present Value)

- The Net Present Value of the Energy Savings will fund the Roof Repair!!

Envelope Improvement

Example of Life Cycle Costs

- You've been presented 2 options for a piece of energy equipment you are buying.
  - The first piece of high-efficiency equipment will cost $30,000 and will require $500 worth of maintenance each year for its life of 10 years. Energy costs will be $5000 per year.
  - The second option is for standard equipment and will cost $25,000. It's maintenance cost is $300 each year for 10 years. Energy costs for this option are $8,000 per year.

  - At a borrowing rate of 5% per year which is the best option?

Example of Life Cycle Costs (cont)

- LCC (option 1) = $30,000 +($5,000+$500)X Interest Factor
- LCC (option 1) = $30,000 + ($5,500)(8.1109)
- LCC (option 1) = $74,610

- LCC (option 2) = $25,000 +($8000+$300)X Interest Factor
- LCC (option 2) = $25,000+($8,300)(*8.1109)
- LCC (option 2) = $92,320

- There are software programs that consider many of the complex variables for life cycle costing.

Using Avoided Costs as an Annuity

Anyone feel the need to simplify?

- Here's what you need to know…
- **Your Energy Savings (avoided costs) Produce an Annuity ($)**
- You can use that Annuity to Secure Financing for work you do yourself OR for work that you contract through others.

Financing Options

- Self Finance – Cash
- Use Bonding Capacity
- KISTA – Small Project Loan
- Performance Contract

QUESTIONS?????