



City of
Blue Earth

**CITY OF BLUE EARTH
AGENDA
CITY COUNCIL WORKSESSION
MONDAY, DECEMBER 2, 2019 @ 4:30 P.M.**

Call to order.

Roll call.

Old Business.

New Business.

1. City Facility Energy Conservation Presentation

Adjourn.

By Order of the Blue Earth City Council

Timothy Ibisch

City Administrator

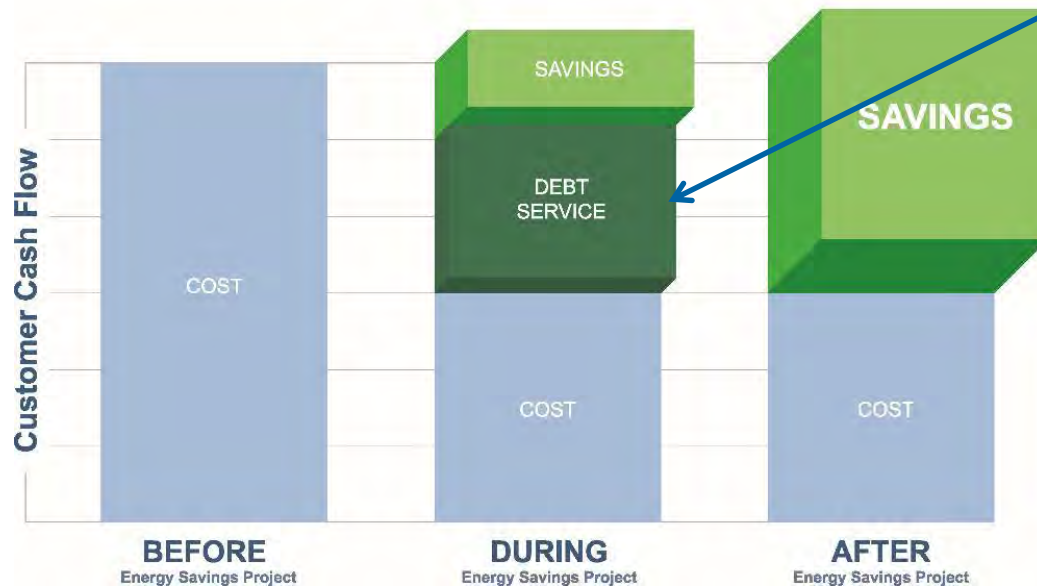
Post @ City Hall-Friday December 29, 2019 through Monday December 2, 2019

Distribute to Mayor & Council members-Media & file

ENERGY SAVINGS AGREEMENT

Performance Contracting: A Budget-Neutral Solution

■ Energy & O&M Cost ■ ESCO & Financial Debt Service ■ Savings *Illustration only, % of savings varies from project-to-project*



Re-Purposed a Portion of Existing Utility Budget to Finance Project Construction Over Time

- MN State Statute §471.345 Energy Efficiency Projects
- Annual Energy Savings **Guaranteed by Ameresco**
- Take advantage of grants, utility rebates, local incentives, etc.
- **Self-funded with little or no capital**
- Project Guaranteed up to **20-Year Term**

PRELIMINARY ASSESSMENT OPPORTUNITY

PROJECT RANGE: \$600K - \$800K SELF-FUNDING

Benefits

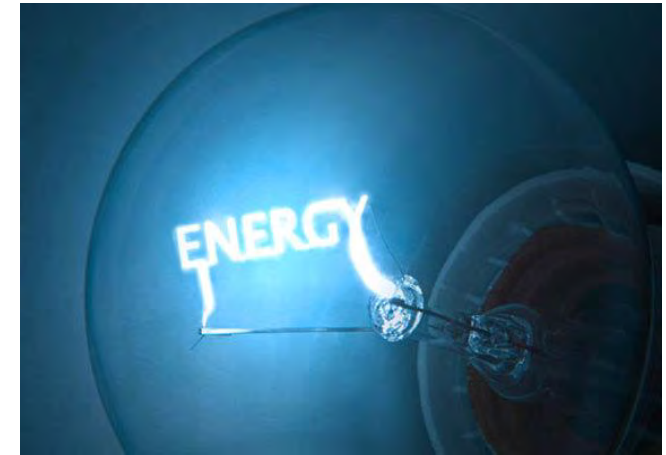
- Building Infrastructure Improvements leveraged by Energy Conservation Measures implementation and savings
- Energy cost savings self-funds **entire project and possibly more!**
- Upgrade inefficient and/or end life equipment/systems
- Reduces *Future* O&M costs (preventative maintenance materials and service contracts)
- Allows City of Blue Earth to redirect existing and future project capital expenditures to nonenergy related projects

Self-Funded Project	
Estimated Project Cost	\$600k - \$800k
Est Annual Cost and O&M Savings	\$30k - \$45k
Utility Rebates Estimate (one-time only)	\$50k
Capital Contribution Required	\$0 (zero)

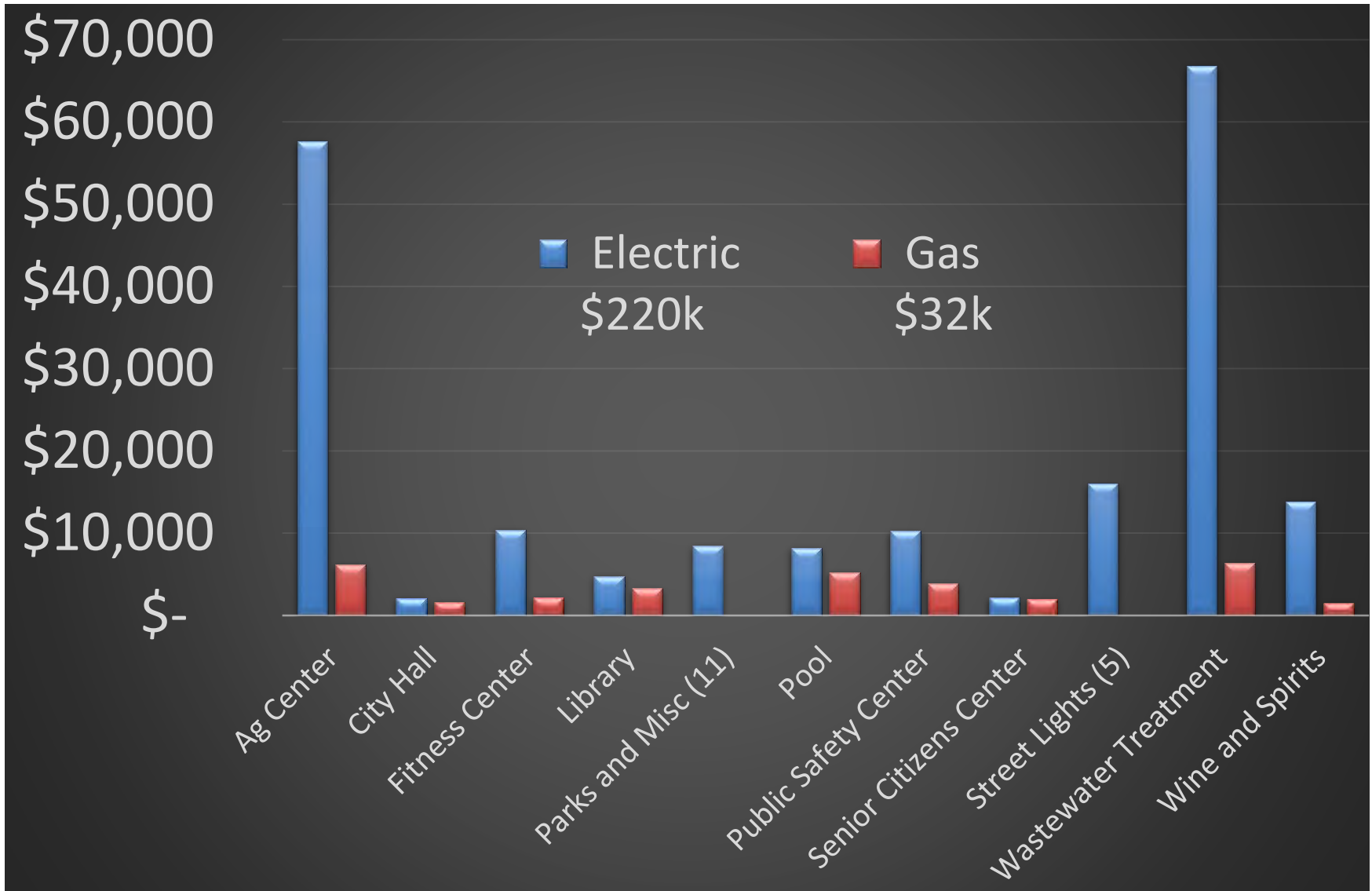
BLUE EARTH – UTILITY PROVIDERS

Utilities Providers

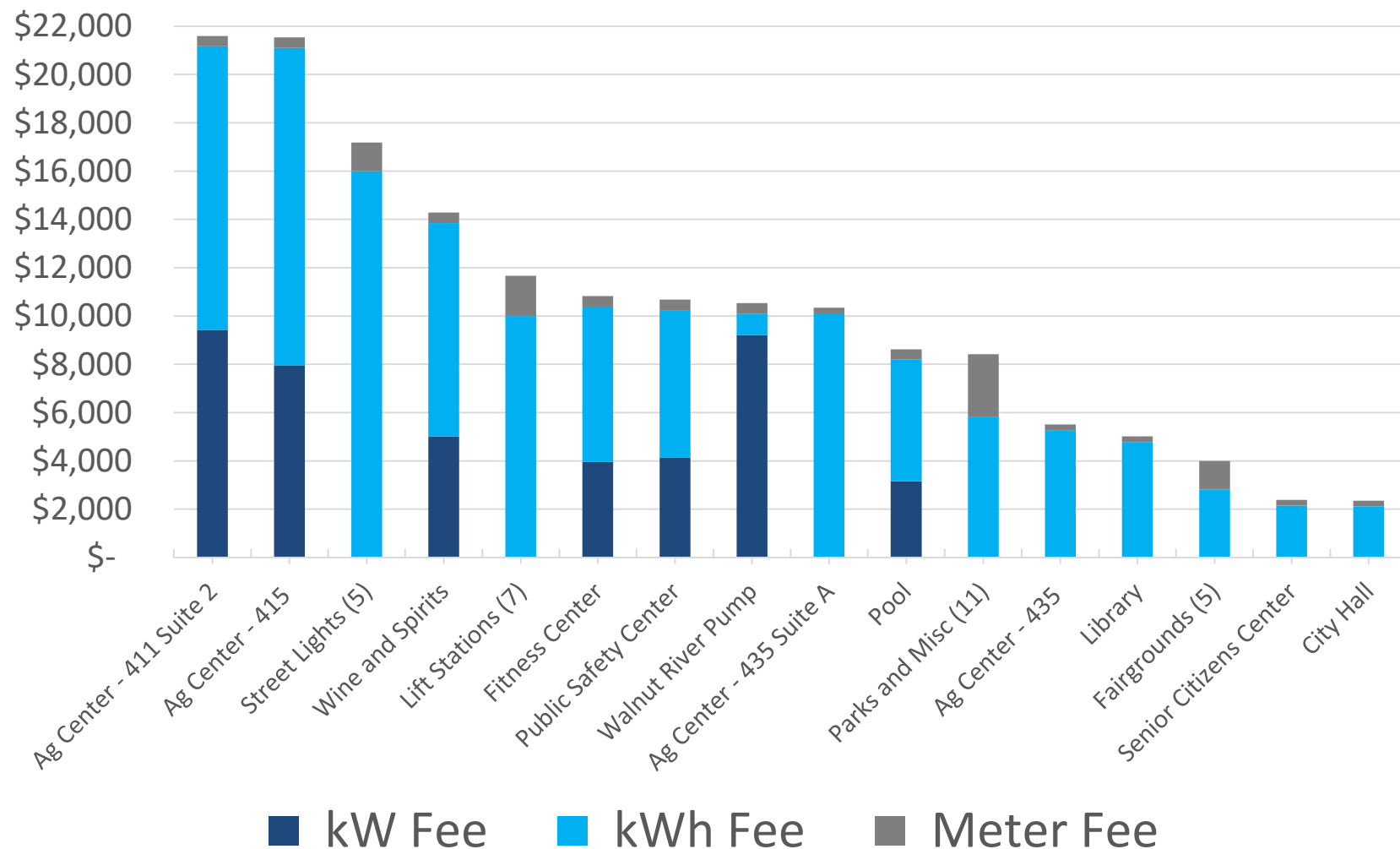
- Blue Earth Public Utilities
 - ◆ Electric and Water
- CenterPoint Energy
 - ◆ Gas
- Energy rates are average



ENERGY COST SUMMARY



FEE SUMMARY



ENERGY CONSERVATION MEASURES (ECMs)

ECMs Identified as Potential Opportunities for City of Blue Earth

	Interior Lighting	Exterior Lighting	Water Conservation	Building Envelope	Mechanical Insulation	Refrigeration	Controls	HVAC	Boilers	Roof-Top Solar
Ag Center	X	X	X	X			X	X		X
City Hall	X	X	X	X			X	X		
Fitness Center	X	X	X	X			X			
Library	X	X	X	X			X			
Parks and Misc (11)	X	X	X				X			
Pool	X	X	X		X				X	
Public Safety Center	X		X	X			X	X		
Senior Citizens Center	X	X	X	X			X			
Streetlights (5)		X					X			
Wastewater Treatment	X	X	X	X						
Wine and Spirits	X	X	X	X		X	X	X		

X = Typically Self-funding ECMs

X = Additional Capital Likely Required

FACILITY LIGHTING IMPROVEMENTS

LIGHTING SOLUTIONS

- ◆ Design proper illumination and controls for functional lighting use
- ◆ Retrofit interior and exterior lighting fluorescent and HID fixtures with LED technology



High Pressure Sodium Wall-Pack at Park Garage - Typical



HID exterior lighting at WWTF - Typical



Fitness Center fluorescent lighting

BENEFITS

- ◆ Reduces energy consumption
- ◆ Reduces future O&M and capital cost
- ◆ Improves overall light quality
- ◆ Improves safety and security
- ◆ Reduces building cooling loads
- ◆ Standardization of lighting types
- ◆ Eliminate mercury containing light material

FACILITY LIGHTING (INTERIOR) IMPROVEMENTS

LIGHTING SOLUTIONS

- ◆ Replace T12 and T8 fluorescent with new LED retrofit kit or fixture
- ◆ Increase use of lighting controls for dimming
- ◆ Retrofit / Replace existing fixture types with LED light technology
 - Design proper space illumination levels
 - Dimming capability where feasible
 - Adding occupancy sensors as appropriate



Existing T12 Liquor Store



Senior Center Fluorescent Lighting

BENEFITS

- ◆ Flexible color and power settings for custom settings
- ◆ Typically high rebate from utilities
- ◆ Reduces energy consumption
- ◆ Reduces future O&M/capital costs
- ◆ Improves overall light quality
- ◆ Improves safety and security
- ◆ Reduces building cooling load/demand
- ◆ Standardization of lighting types
- ◆ Eliminate mercury-containing light material

EXTERIOR LIGHTING IMPROVEMENTS

EXTERIOR LIGHTING SOLUTIONS

- ◆ Replace metal halide (MH) and high-pressure sodium (HPS) with LED technology
 - Parking lot fixtures
 - Wall-packs fixtures
 - Soffit fixtures
 - Bollard/Walkway fixtures
- ◆ Investigate timers, hi/low controls, photocells per location



HPS Wallpack



Halogen Flood

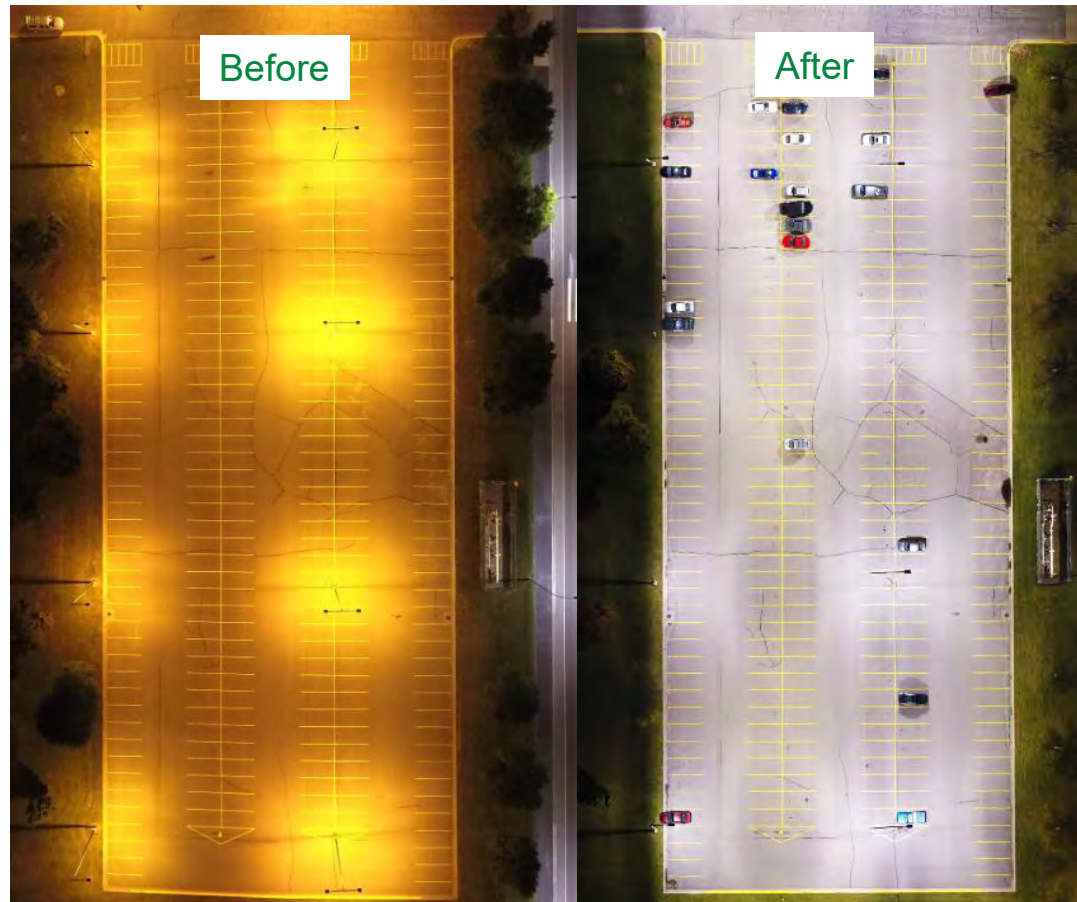


*LED Installed in Old
HPS Shoebox Fixture*

BENEFITS

- Reduces energy consumption
- Reduces future O&M and capital cost
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LED / HPS COMPARISONS



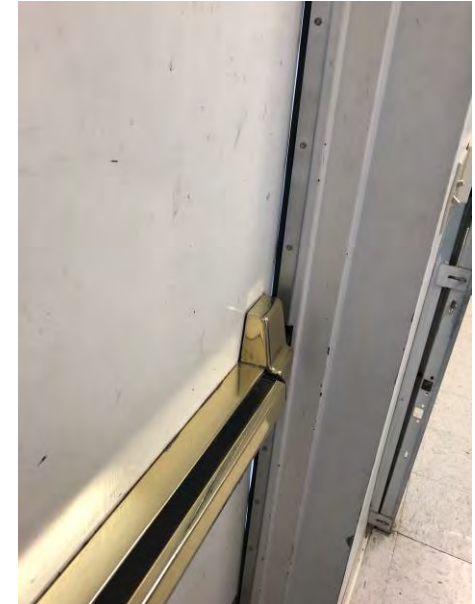
*Examples: Photos taken by Drone:
parking lot upgrade from HPS to LED*



BUILDING ENVELOPE IMPROVEMENTS

BUILDING ENVELOPE SOLUTIONS

- ◆ Caulk and add door weather-stripping
- ◆ Address window leaks and insulation needs
- ◆ Seal wall penetrations and roof-wall joint air infiltration gaps
- ◆ Door sweeps and garage doors



Door needs weather-stripping – Ag Center

BENEFITS

- ◆ Reduce heating/cooling energy costs
- ◆ Reduced HVAC run-time, extending equipment life cycle
- ◆ Eliminate drafts
- ◆ Prevents moisture damage and ancillary moisture problems
- ◆ Improve occupant comfort
- ◆ Improves building aesthetics



Leaking Window Frames – Library & Senior Center

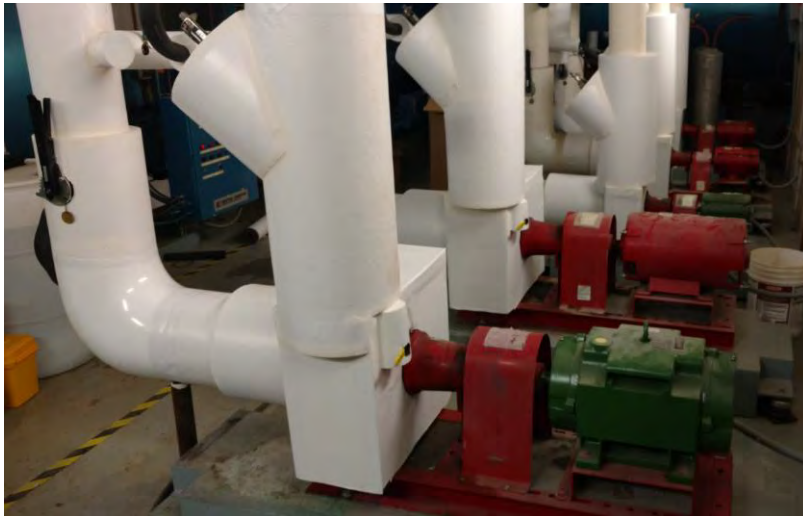


MECHANICAL INSULATION IMPROVEMENTS

MECHANICAL INSULATION SOLUTIONS

Insulate exposed piping and equipment

- ◆ Piping
- ◆ Valves
- ◆ Elbows
- ◆ Pumps
- ◆ Flanges



EXAMPLE
Insulated piping, valves, pumps, and flanges



Pumps – Crescent Apartments

BENEFITS

- ◆ Natural gas cost savings
- ◆ Reduces thermal energy loss to space
- ◆ Increase comfort
- ◆ Improved hydronic heating system temperature control and consistency
- ◆ Improves safety (minimizes personal hazards)

WATER CONSERVATION

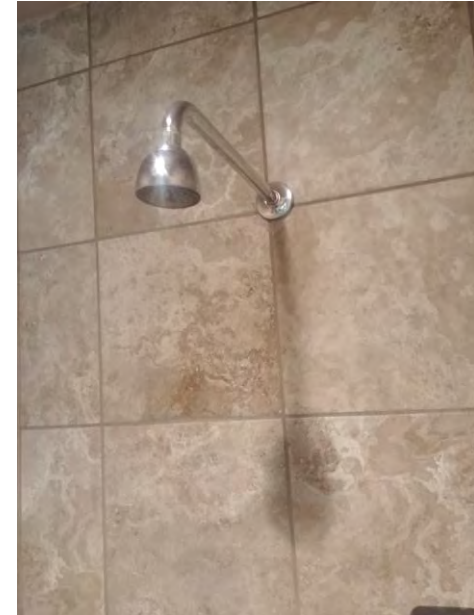
WATER CONSERVATION SOLUTIONS

- ◆ Install low-flow faucet aerators
- ◆ Replace showerheads with low-flow
- ◆ Provide low-flow toilets and urinals

NOTE: flowrates adjusted to ensure fixtures/waste disposal are functioning properly



High Flow Faucets – Pool



High Flow Shower Fixtures at Fitness Center

BENEFITS

- ◆ Water savings
- ◆ Wastewater savings
- ◆ Gas and electric savings / domestic hot water

REFRIGERATION EQUIPMENT

LIQUOR STORE SOLUTION

- ◆ Replace aged refrigeration equipment
- ◆ Use high efficiency Electric Commutated Motors



Condensing units – Liquor Store

BENEFITS

- ◆ Improved performance and energy savings
- ◆ Replace obsolete refrigerant
- ◆ Fan cycling reduction – Extend system life cycle
- ◆ Reduced cooling load from motor efficiency and reduced defrost cycles
- ◆ Quiet operation



Example of Quick Response Controller and new evaporator



EC motor cut-away



**ADDITIONAL ECMs
WHICH MAY REQUIRE
CAPITAL CONTRIBUTION**

CONDENSING UNIT REPLACEMENT

CONDENSING UNIT SOLUTIONS

- ◆ Replace existing aged condensing units with new, high efficiency units
- ◆ Upgrade with environmentally friendly refrigerants



Condensing Units – City Hall



Condensing Units – Police Station

BENEFITS

- ◆ Energy consumption/costs reduction
- ◆ Replace aging equipment
- ◆ Replacing obsolete refrigerant (R-22 to R-410A)
- ◆ Reduce maintenance time and cost
- ◆ Avoided future capital budget dollars

HVAC REPLACEMENT

HVAC SOLUTIONS

- ◆ Replace 20 plus year old equipment with high efficiency units
- ◆ Upgrade and recommission controls



Furnace – Police Station



Package unit – Liquor Store

BENEFITS

- ◆ Energy savings through improved equipment efficiency
- ◆ Reduced future O&M cost
- ◆ Improved performance
- ◆ Avoided future capital budget dollars

POOL HEATER

BOILER SOLUTIONS

- ◆ Upgrade aged standard efficiency boilers with new high efficiency condensing boilers with the CuNi heat exchanger specifically for pool water



Example of Condensing Boiler



Existing Boilers - Pool

BENEFITS

- ◆ Gas savings for:
 - Low temperature applications and high-efficiency condensing
- ◆ Replacement of end-of-life equipment (energy and capital cost avoidance)
- ◆ Operation and Maintenance cost savings
- ◆ Improved boiler modulation

ATHLETIC FIELD LIGHTING REPLACEMENTS

FIELD LIGHTING SOLUTIONS

- ◆ Replace HID field lighting with LED fixtures
- ◆ Install Wi-Fi Network Controller
- ◆ Retain existing poles



Existing Flood Lights – Tennis Courts



Example LED Field Lighting System

BENEFITS

- Reduces energy and operating costs
- Reduces future O&M and capital cost
- Improves overall lighting quality
- LEDs are “Instant ON” and don’t require a warm-up cycle
- Longer life expectancy (100,000+ burn hours)
- Standardization of lighting types

FINANCE OPTIONS

TAX EXEMPT LEASE PURCHASE

Most frequently used financing method

- * Standard form of financing. Private placement. RFP Finance Companies
- * Up to 20-year term
- * Lower rates and closing costs, ease of execution. Good for smaller projects
- * Tax Exempt

PUBLIC BONDING

Often used financing method

- * Large, public bond market with multiple buyers
- * Up to 20-year term
- * Lower rate, cost of issuance can be higher. Best for larger projects
- * Tax Exempt

DIRECT CAPITAL FUNDED

Occasionally used financing method

- * Customer direct capital funding
- * Possible larger projects
- * Guarantee cost savings maintained through performance period
- * Finance cost savings - no finance cost

COMBINATION OF ABOVE

Least used financing method

- * Customer partially funding project with capital and finance option
- * Possible larger projects
- * Guarantee cost savings maintained through performance period

EXECUTIVE SUMMARY

PROJECT

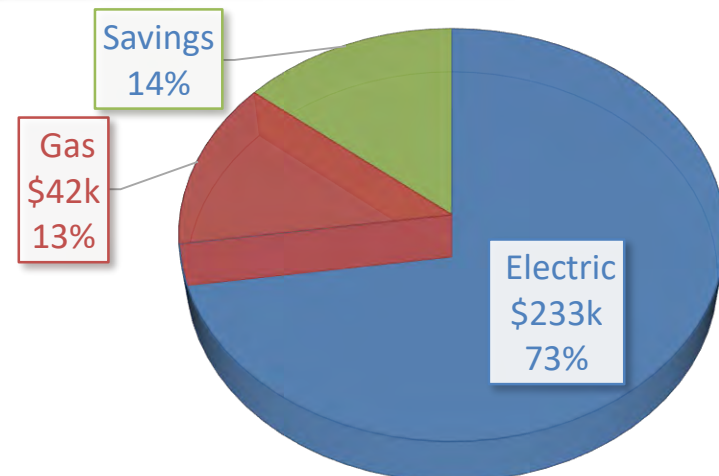
- Cost of Project: \$800k
- City Capital Contribution: \$0
- Term of Contract: 20 years
- LED Lighting upgrades
 - Interior
 - Exterior
- Building Envelope improvements
- Water Conservation

BENEFITS

- Guaranteed Energy Savings
- Self-funding – no taxpayer impact
- LED Lighting Improves security & camera clarity
- City-Wide Equipment Replacements/Upgrades
- Renewable energy production
- Sustainability Recognition by the City

RESULTS

- 14% reduction in annual energy consumption
- Combined \$45K in annual energy and maintenance savings
- Improved occupant comfort, quality of living, and sense of community stewardship
- GreenStep City Level 2 Achievement



Annual City Energy Cost = \$275,000