



**High School Infrastructure Presentation to**  
**Polo Community Unit School District 222**  
*Gateway to Excellence*

February 18, 2010



# Polo High School

## Existing Conditions

## Roof



- Approximately 15 years old
- History of leaks
- Some skylights have been repaired

## Windows



- Single pane glass panels are a source of infiltration
- Glass block windows are a source of leaks
- No screens on operable windows

## Lighting/Electrical



- Metal halide lights in shop and gym
- No occupancy sensors
- New 2000 amp, 208 Volt service

## Plumbing



- Original fixtures
- Manual flush valves (3.5 to 5 gallons/flush)
- New water heater serves kitchen

## Heating, Ventilation & Air Conditioning (HVAC)



- Single boiler is approximately 50 years old
- No air conditioning in majority of original building
- Steam piping buried below slab

## Heating, Ventilation & Air Conditioning (HVAC)



- “Fresh” air enters classrooms from tunnel
- Water often found on tunnel floor
- Tunnel used as a tornado shelter

# Polo High School

## Recommendations

## 1. Improvements to HVAC System

- 1A – Geothermal heating and cooling system
  - Most energy efficient heating and cooling system
  - Less efficient when only heating is used
- 1B – Two-pipe unit vent heating only system
  - Lower cost overall
  - Air conditioning not included
- 1C – Two-pipe unit vent heating and cooling system
  - Efficiency not dependent on use patterns
  - Most costly to implement

## 2. Lighting Retrofits

- Replace 84 metal halide fixtures with fluorescent fixtures
  - Reduces energy usage by approximately 40%
  - Instant "on" and "off"
- Replace remaining T-12's with T-8's
  - Reduces energy use and maintenance costs
  - Can take advantage of DCEO Grants

### 3. Install Occupancy Sensors

- Install occupancy sensors in select spaces
  - Reduces lighting load by approximately 10-50%
  - Can take advantage of DCEO Grants
- Connect occupancy sensors to HVAC system
  - Maximize energy efficiency
  - Improve occupant comfort

## 4. Water Conservation

- Replace/retrofit domestic water fixtures
  - Reduce water use
  - Reduce maintenance on old fixtures
  - Improve aesthetics

## 5. Window Replacement

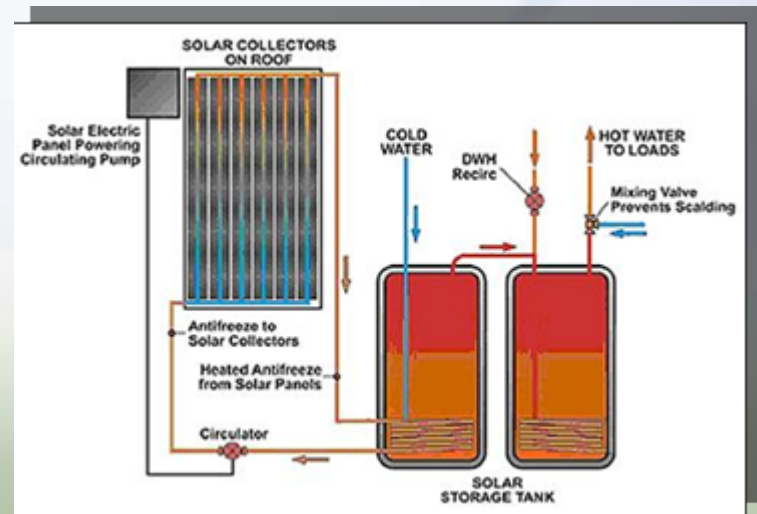
- Replace windows and block glass with dual glazed energy efficient windows & screens
  - Reduce water and air infiltration/energy use
  - Improve aesthetics
  - Improve operability
  - Reduce maintenance
- Add internal mini-blinds
  - Reduce maintenance and cleaning costs
  - Improve aesthetics

## 6. Roofing Improvements

- Apply white roof coating
  - Protect and prolong existing roof
  - Reduce thermal shock stress on roof structure
  - Keep building cooler in the summer
- Replace curb flashing and add metal coping over existing concrete coping and termination bars.
  - Keep moisture out – protect building structure

## 7. Solar Domestic Water Heating

- Install supplemental solar domestic water heating system
  - Significantly reduce heating costs for domestic water
  - Renewable/Green energy source
  - Educational value



## 8. Small Scale Wind Turbine

- Install 1kW wind turbine with tracking display system
  - It's free
  - Educational value
  - Reduce electric usage



# Polo High School

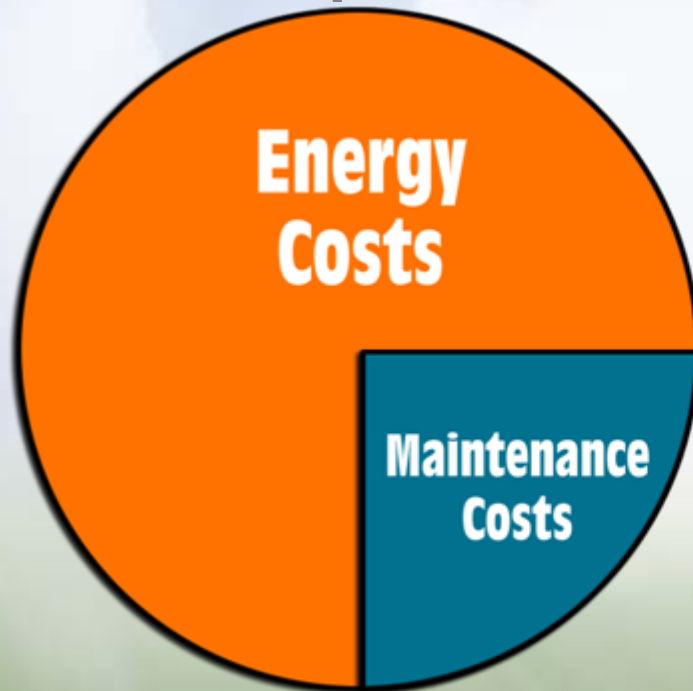
## Project Options for Consideration

## Project Options to Consider

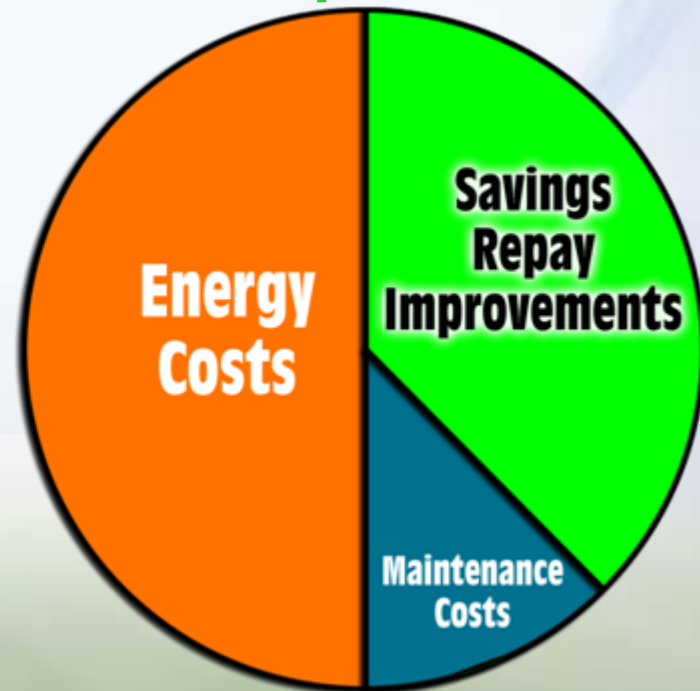
- **Project 1**: Geothermal HVAC System (1A)
  - Budget: \$1,990,000
- **Project 2**: Geothermal HVAC System (1A), Lighting (2), and Occupancy Sensors (3)
  - Budget: \$2,071,200
- **Project 3**: Geothermal HVAC System (1A), Lighting (2), Occupancy Sensors (3), and Roofing (6)
  - Budget: \$2,351,200
- **Project 4**: Geothermal HVAC System (1A), Lighting (2), Occupancy Sensors (3), Window Replacement (5), and Roofing (6)
  - Budget: \$3,231,200

# Using Energy Performance Contracting to Fund Capital Improvements

Before Improvements



After Improvements



## Immediate Financial Benefits

- Capture energy and operational savings now rather than later
- Avoid significant construction cost increases (5-10% per year) – delays cost money
- Take advantage of favorable interest rates if you finance
- Take advantage of new grants available through various sources including the DCEO
- Visible commitment to building improvements, environmental responsibility and sustainable initiatives can increase community support

## ESG's Strengths

**1. Single-source accountability**

**2. Product independent**

**3. In-house engineering & PM**

**4. Experience in retrofit projects**

**5. Focus on energy efficiency**

**Thank you for your time!**

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