

Longmont

POWER & COMMUNICATIONS



Energy Performance Contracts; A Viable Method to Upgrade Municipal Facilities

Mike Frailey



Background

City Facilities

- 800,000 square feet total
- Low-bid construction
- Lack of commissioning
- Deferred maintenance
- Small maintenance staff



EPC Resources



Colorado
Energy Office



- Colorado Energy Office (CEO) services
 - Performed feasibility study
 - Meetings with city staff making the decision
 - Pre-approved Energy Services Company (ESCO) list
 - Standard contracts
 - Technical Energy Assessment (contract with ESCo)
 - Energy performance contract (contract with ESCo)
 - Lease contract agreement (contract with lender)

EPC Process



Colorado
Energy Office



- Feasibility study review with City staff
 - Good energy savings potential
- Conducted ESCo interviews CEO-approved list
- Selected McKinstry Essention, Inc. (McKinstry)
 - Technical Energy Assessment (TEA)



EPC Process



Phase I Energy Performance Contract (EPC)

- Civic Center
- Development Services Center
- Library
- Safety & Justice Center
- Recreation Center
- Centennial Pool
- Phase I total 300,000 SF
- \$2.8M total cost



Grants Awards

- Department of Local Affairs (DOLA)
 - \$300,000 grant

Department of Local Affairs

Strengthening Colorado Communities

- Colorado Solar Energy Industries Association (COSEIA)
 - \$82,500 grant

**COSEIA**

Colorado Solar Energy Industries Association

COLORADO'S NONPROFIT SOLAR LEADER

Improvement Measures

Lighting

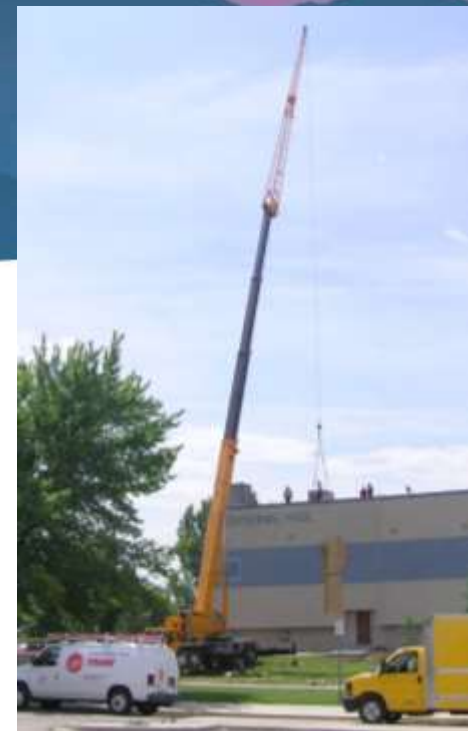
- Retrofits & Replacements
 - T12 to T8 fluorescent
 - Old T8 to T8 fluorescent
 - Metal Halide to T8 fluorescent
 - Metal Halide & High-pressure sodium to CFL
- Controls
 - Occupancy sensor
 - Photocells
 - Lighting panels



Improvement Measures

HVAC & controls

- Centennial Pool
 - Roof top units
 - Air handling units
- Civic Center
 - Radiant baseboard replaced with forced air
- Recreation Center
 - Air-curtain
 - Installed two variable frequency drives for heat recovery units
- Control standardization & expansion
 - Library & Civic upgraded Trane Tracer Summit
 - Control points added



Improvement Measures

Commissioning

- Building automation system: optimization of control devices, sensors, set-points, sequence of operation
- Air-handling equipment: rooftop & variable air volume units, fans, coils, unit heaters, exhaust systems
- Hot-water systems: boilers, heaters, pumps, coils, control & balance valves



Improvement Measures

Renewable Energy Measures

- Building-integrated photovoltaic system
- Rated output 3.5 kW
- Civic Center Complex
 - 4 separate buildings built 1975
 - Converted to single building 1993
- DOLA grant objectives
 - Improve community centers
 - Provide public benefit
 - Technology demonstration



Improvement Measures

Renewable Energy

- DOLA & COSEIA grants
- Centennial Pool
 - 96 evacuated tube panels
 - 1,050 MMBTU annually
 - Pool or domestic hot water
- Recreation Center
 - 120 evacuated tube panels
 - 1,300 MMBTU annually
 - Lap pool or leisure pool



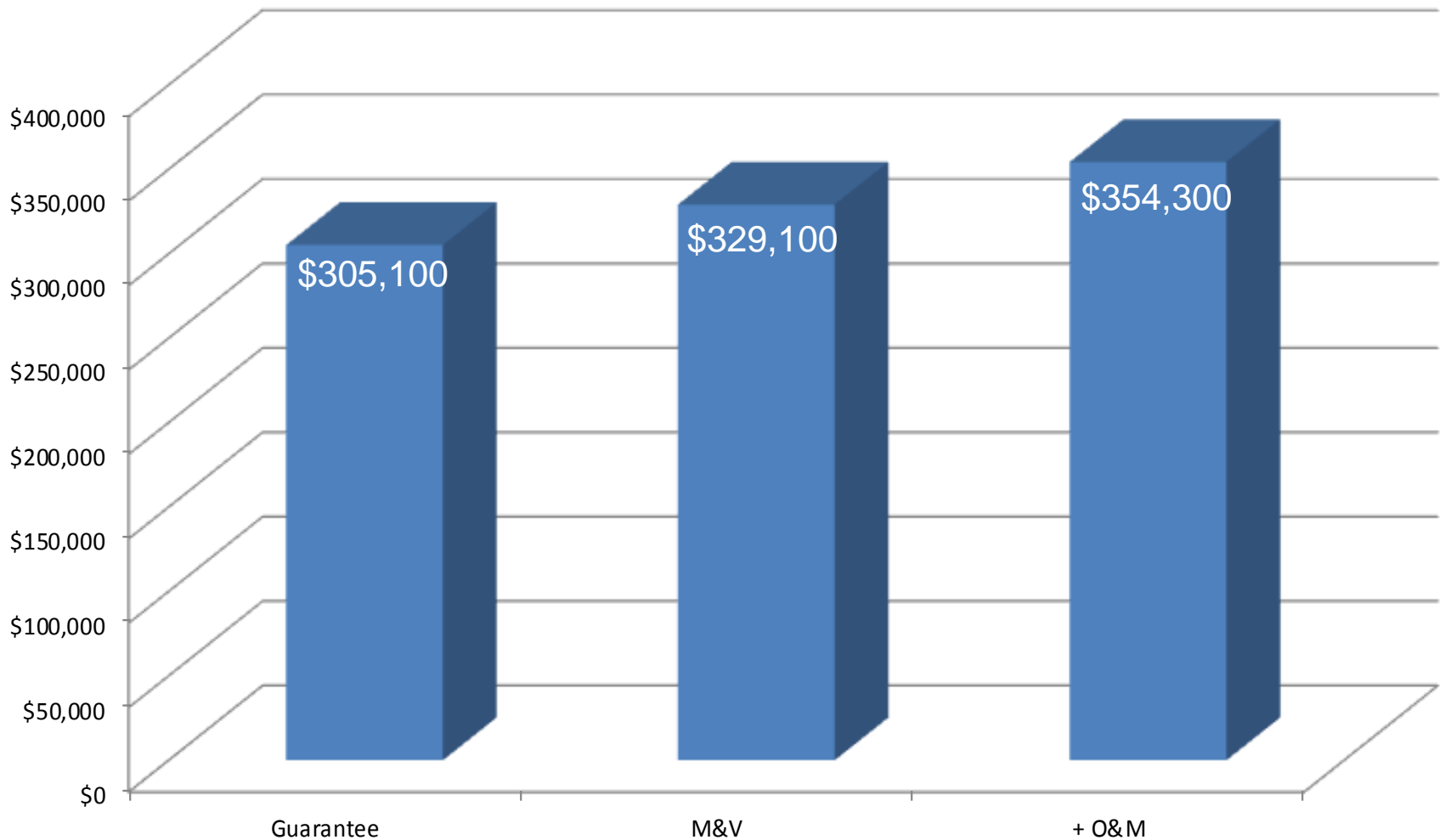
Measurement & Verification

- ESCo performs Measurement & Verification (M&V) annually
 - CEO offers 3rd-party verification service
- M&V costs covered by energy savings
- Customer can decline M&V after 3rd year

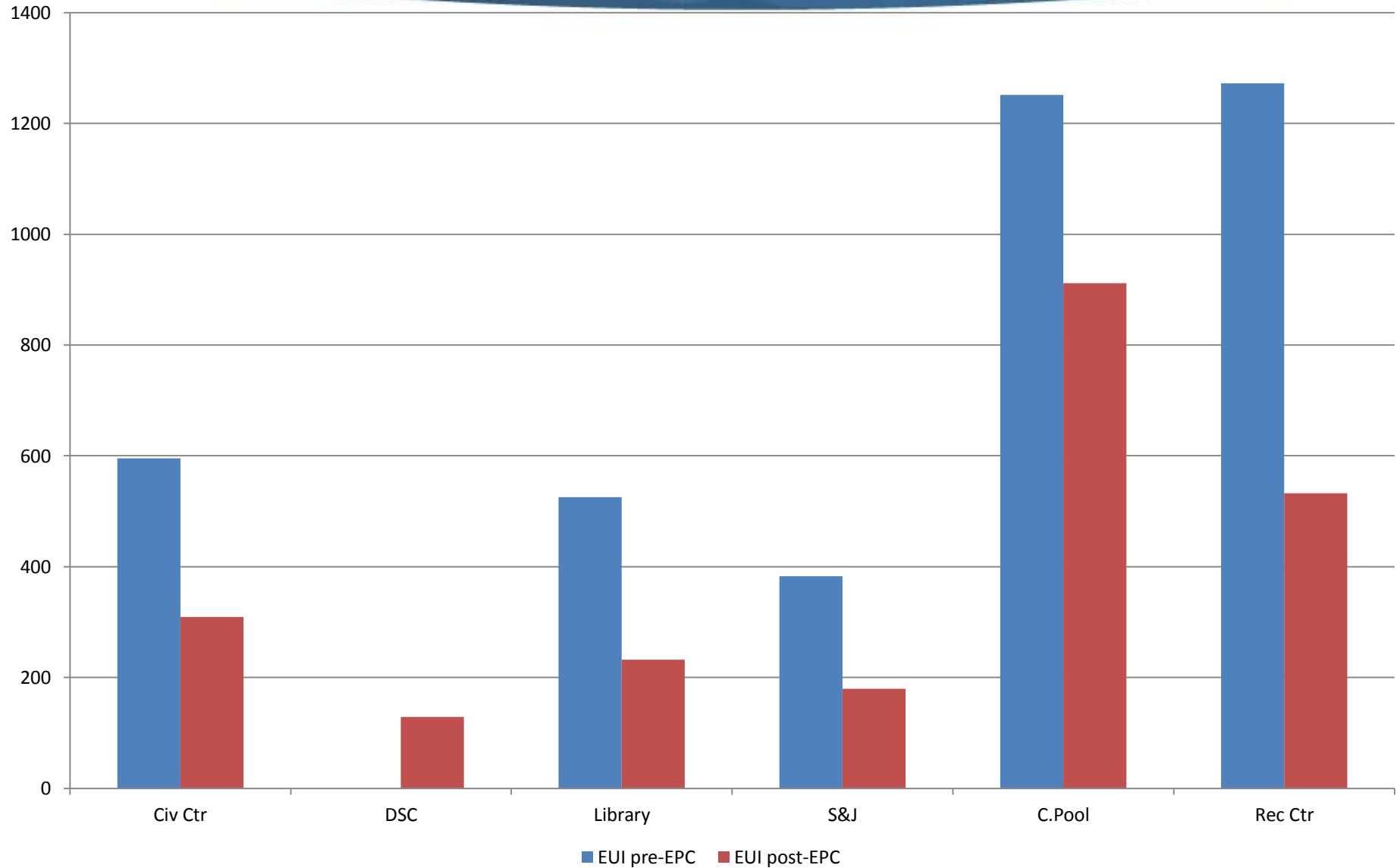


Cost Savings

Verified Phase I Savings



Energy Use Index Reductions (kBTU/SF)



Lessons Learned

- Building schedules
 - Door hours vs. staff hours
 - Seasonal
 - Emergency operations
- Maintaining schedules & set-points
 - Temporary HVAC over-ride
- Solar thermal
 - Pool temperature sensitivity
 - Multiple heat sinks



Questions?

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Colorado
Energy Office

www.colorado.gov/energy



This project is eliminating **2,350** metric tons of CO₂ emissions which equates to planting **640** acres of trees or removing **406** cars from local highways

CITY OF LONGMONT

Phase I Energy Performance Contract of the Quail Recreation Center, Centennial Pool, Safety & Justice Center, Civic Center, Library and the Development Services Center includes the following projects:

- Solar Thermal installations to heat the City's pools
- Solar Photovoltaic Skylights at the Longmont Civic Center
- High efficiency lighting retrofits
- Air-side mechanical system replacement at the Centennial Pool
- Active Energy Management using real-time utility consumption data
- Energy Management System upgrades
- Mechanical system upgrade at the Longmont Civic Center
- Retro-commissioning

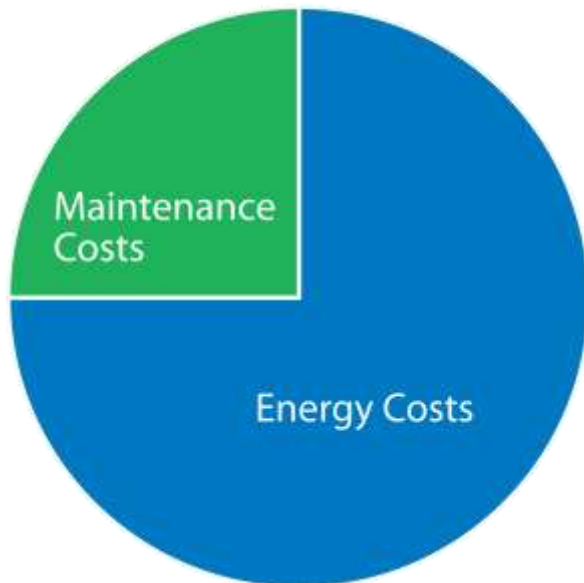
THE CITY OF LONGMONT IS A MEMBER OF THE ENERGY EFFICIENCY PARTNERSHIP (EEP) AND IS COMMITTED TO REDUCING GREENHOUSE GAS EMISSIONS AND IMPROVING ENERGY EFFICIENCY.



Energy Performance Contract (EPC)

Energy Performance Contracting is a financing mechanism used to pay for energy efficiency improvements all at once that are then paid back through annual energy savings.

Before Improvements



Pre-EPC

After Improvements



Post-EPC

