



# Developing a Strong Energy Savings Performance Contracting Project

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Celtic Energy

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**Appalachian State University**

**The Investment-Grade Audit**

# Introduction

- Comprehensive masters-level university
- Sustainability is core to university
- 18,800 students, 110 buildings, 5.1 million GSF
- Two ESPCs
  - ESPC I: \$5.1 M with Pepco Energy Solutions
    - In 3<sup>rd</sup> performance year, all savings achieved
  - ESPC II: \$15.9 M with Pepco Energy Solutions
    - To be complete by July 1, 2015

# ESPC Best Practices

- Identify a Champion early!
  - Get Senior Leadership Buy-in
- Fully understand your current energy profile
  - Use, demand, growth, seasonal changes, customer requirements, etc.
- Clearly define the goals for your project
  - Energy Reduction, Deferred Maintenance, New Technology Demonstration, etc.

# ESPC Best Practices *(Cont.)*

- Understand the approval process and build a schedule to include all approval milestones
- Develop clear ESCO selection criteria
- Actively lead the process

# The Investment Grade Audit

- A well-thought-out scope of work is key
  - Keep it simple the first time
  - No esoteric technologies; ice storage, co-gen, etc.
- Know your financial limits
  - How much debt will your organization tolerate
  - How long a term 5, 10, 20 years??
  - ESCOs will always want to go bigger

# The Investment Grade Audit (Cont.)

- Drive the train!
  - Don't be a passive passenger
  - Don't be an uninformed consumer
    - Know what you are buying
    - It's not just about the payment
  - Have a good 3<sup>rd</sup>-party owner's representative

# Negotiating the Energy Services Agreement

- The 3<sup>rd</sup>-Party Owner's Rep
- Balancing savings and costs
  - Model the options in a spread sheet
  - Identify tradeoffs
  - Don't forget the goals of the project!



# Negotiating the Energy Services Agreement *(Cont.)*

- Understand the annual costs above and beyond debt service
  - M&V
  - Maintenance agreements, repair parts
  - Training, etc.
  - Other hidden costs



# Final Thoughts

- Getting to yes
- Pencils Down!
- Educating your budget office
- Who owns the tax credits?
- Time is money
- Implementation-year savings
  - Can you keep?
  - Return to the State?

# Takeaways

- Have a Champion
- Understand your energy use profile
- Have strong project goals
- Understand what you are buying
- Trust but verify

Questions: Mike O'Connor  
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**Peter Berger**  
**Minnesota Department of Commerce**

**Cost and Pricing**

# How do I know my ESPC project is a fair deal for my organization?

- Projects are performed in existing facilities
- No two projects are alike in size, scope, location, etc.
- First the contractor is selected;
- Then the project is developed and priced
- Pricing is not always transparent

# Many factors determine what you can afford to pay...

- $\text{Project Price} - \text{Rebates} - \text{Capital Contribution} = \text{Amount Financed}$
- $\text{Amount Financed} \times \text{Lease Rate Factor} = \text{Annual Lease Payment}$
- $\text{Utility Savings} + \text{O\&M Savings} = \text{Annual Savings}$
- $\text{Annual Savings} = \text{OR} > \text{Annual Lease Payment}$
- None of these factors should determine the project price

# Use a Two-Step Procurement Process

- First – Issue RFP to pre-qualify ESCOs
- Second – Issue Site-Specific RFP to select ESCO for your project from pre-qualified list



# Pre-qualification RFP

- Established maximum audit costs, markups and fees for each ESCO
  - Investment Grade Audit Fee
  - Percent of Total Project Price for Eight (8) Construction Cost Categories
  - Overhead and Profit Markups
- These maximums must not be exceeded in responding to Site-Specific RFPs

# Integrate Cost and Pricing Into ESCO Selection Process

- Include Markups and Fees in the Selection Criteria
- Require Open Book Pricing
- Don't allow ESCO to self-perform trade work without written approval
- Don't allow sole source product specifications without written approval
- Require Competitive Bidding of Trade Work and Equipment (optional)
- Prescribe Project Cost Reconciliation Process
- Negotiate terms and enter into ESPC Contract for Investment Grade Audit
- Later Amend ESPC Contract to Add ESPC Project Scope, M&V Services, Performance Guarantee, etc.

# GESP Master Contract

## Exhibit B Contractor's Fees

### 1. Contractor's Fees for Investment Grade Audit

The total compensation payable to the Contractor to fully perform the Contractor's Duties specified in Exhibit A, Section I of this Work Order Contract shall be the lesser of the total obligation payable under Section 3 of this Work Order Contract or an amount equal to the total square footage of building space that the State Institution authorizes, in writing, to be audited by the Contractor multiplied by \$0.##.

### 2. Costs, Markups, and Fees

Costs, markups and fees applicable to the cost estimates developed in the Performance of the Contractor's Duties as specified in Exhibit A, of this Work Order Contract shall not exceed the lower of the maximum amounts established in the Master Contract or this Work Order Contract. Markups shall not be applied to fees.

#### 2.1 Project Costs

The table below indicates the Contractor's proposed Maximum Percentage of the construction project's Total Project Price for each Project Construction Cost Category.

Project Construction Cost Category	Maximum Percent of Total Project Price	Self-Performed by Contractor or Subcontracted
Subcontractor Costs (Other Contractor Costs to Contractor)	N.A.	
Other Direct Purchases of Equipment, Material, Supplies by the Contractor (do not include subcontractor supplied purchases as they should be included above)	N.A.	
Design (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Project Management (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Commissioning (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Training (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Warranty (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Construction Measurement and Verification (state at right whether this shall be completed by the Contractor or subcontracted)	X%	
Permits (markup allowed only if permits are acquired by Contractor)	X%	
Performance Bond	X%	

### 2.2 Project Markups

The table below includes the maximum percentage markups the Contractor may apply to direct purchases of material, equipment and subcontracts under this Work Order Contract.

Project Markup	Maximum Percent Markup
Overhead Percent	X%
Profit Percent	X%

### 2.3 Self-Performed Work Fees

The table below includes the position descriptions and hourly rates for labor and services self-performed by the Contractor. Markups shall not be applied to fees.

Position Description	Hourly Rate
Position	\$xx.xx
Position	\$xx.xx
Position	\$xx.xx
Position	\$xx.xx

### 2.4 Open Book Pricing

The Contractor shall fully disclose all costs of materials and labor purchased and subcontracted by the Contractor and a list of hourly rates and position descriptions for labor or services provided by the Contractor. Estimates for number of hours required for the project and deviations of these budgeted hours shall require prior written approval by the State or shall not be paid. Contractor shall maintain cost accounting records on authorized work performed under actual costs for labor and material, or other basis requiring accounting records. Contractor shall retain these records and afford the State access thereto pursuant to Master Contract, Section 9: State Audits. Costs will be evaluated through price analysis to compare costs with reasonable criteria such as established catalog and market prices or historical prices. The pricing methodology and individual cost markups disclosed during preliminary contract negotiations will be expected to be applied, providing the scope and size of the project remain the same as assumed when markups were disclosed.

# GESP Master Contract

## 2. Open Book Pricing

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Estimates for number of hours required for the project and deviations of these budgeted hours shall require prior written approval by the State or shall not be paid. Contractor shall maintain cost accounting records on authorized work performed under actual costs for labor and material, or other basis requiring accounting records. Contractor shall retain these record and afford the State access thereto pursuant to Clause 9: State Audits. Costs will be evaluated through price analysis to compare costs with reasonable criteria such as established catalog and market prices or historical prices. The pricing methodology and individual cost markups disclosed during preliminary contract negotiations will be expected to be applied, providing the scope and size of the project remain the same as assumed when markups were disclosed.

# GESP Master Contract

## Costs, Markups and Fees

- Costs include subcontracted work, direct purchases of equipment, material and supplies installed on the project
- Fees include ESCO self-performed work, IGA and contingency
- Markups shall not be applied to Fees

# GESP Project Budget Worksheet

Minnesota Guaranteed Energy Savings Program - Project Budget Worksheet

Site:

		Project Budget	Fees (1)	Costs (2)	Overhead Markup (4)	Profit Markup (4)	Price	Maximum Percent of Total Project Price (4)	Actual Percent of Total Project Price	Self-Performed by ESCO or Subcontracted
		<b>Construction Fees and Costs</b>			0.0%	0.0%				
	a	Subcontractor Costs (Contractor Costs to ESCO)	N/A	\$ -	\$ -	\$ -	\$ -	N/A	N/A	N/A
	b	Other Direct Purchases of Equipment, Material, Supplies (Supplier Costs to ESCO)	N/A	\$ -	\$ -	\$ -	\$ -	N/A	N/A	N/A
	c	Design (3)	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	d	Project Management	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	e	Commissioning	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	f	Training	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	g	Warranty	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	h	Construction Measurement and Verification	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	
	i	Permits	N/A	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	N/A
	j	Performance Bond	N/A	\$ -	\$ -	\$ -	\$ -	0.0%	#DIV/0!	N/A
sum (a:j) =	k	<b>Project Price Subtotal with Overhead &amp; Profit</b>	\$ -	\$ -	\$ -	\$ -	\$ -			
		<b>Other Fees</b>								
	o	Investment Grade Audit and Project Proposal	\$ -				\$ -	N/A	N/A	
	p	Contingency	\$ -				\$ -		#DIV/0!	
sum(k:p) =	q	<b>TOTAL PROJECT PRICE</b>					\$ -			

- NOTES:** (1) Fees include ESCO self-performed work, IGA and contingency. Markups shall not be applied to fees. ESCO shall provide a list of hourly rates and position descriptions for labor or services provided.
- (2) Costs include subcontracted work and direct purchases of equipment, material and supplies installed on the project.
- (3) Design includes all types of engineering: design, electrical, mechanical, structural, civil, energy modeling, etc.
- (4) Lesser percent of Overhead, Profit, and Total Project Price from ESCO's Master Contract or Work Order Contract.

Color = input cell



**Peter Berger, LEED AP BD&C**

Guaranteed Energy Savings Program Manager

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**Website:**

<http://mn.gov/commerce/energy/topics/financial/Energy-Savings-Programs/Government/Guaranteed-Energy-Savings-Program/Program-Resources/GESP-Program-Master-Contract.jsp>

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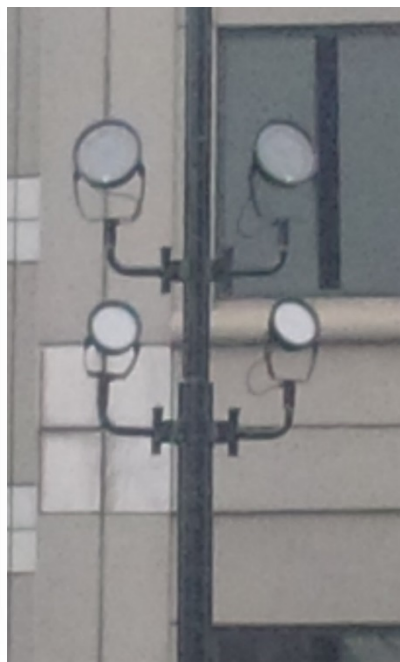
**Larry Falkin**  
**City of Cincinnati**

**Monitoring & Verification**



# ESPC in Cincinnati

- Completed: 3 Phases Totaling \$20 Million
- 70 Buildings; 4,000 Streetlights; 18 Vehicles
- Included: 101kW Solar Panels; 1 Green Roof

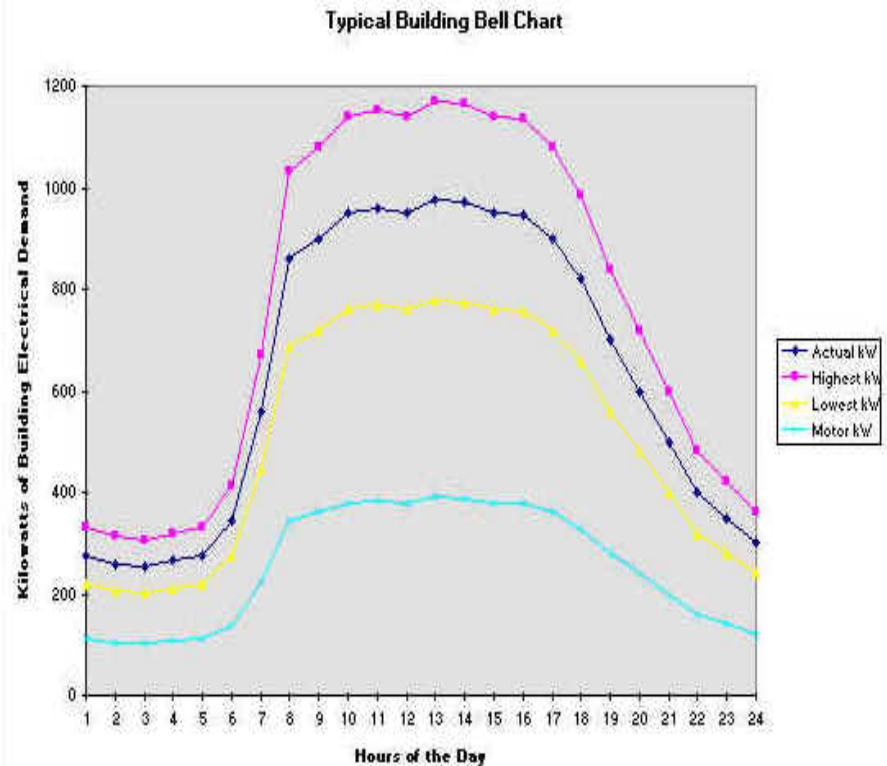


# ESPC in Cincinnati

Year	Total Project Costs	City Financed w/Energy Savings	City Capital	Duke Energy Rebates/State Grants	Federal Grant Funding	State Grant Funding	Annual Energy Reduction	Annual Energy Generation	Annual GHGE Reduction	City's Annual Energy Savings
2009	\$5,908,691	\$4,511,652	\$469,000	\$190,172	\$334,930	\$402,937	3.8M kWh/ 116,213 ccf	100,000 kWh	3,437 metric tonnes	\$449,344
2010	\$8,810,640	\$6,515,953	\$1,238,737	\$253,574	\$802,376	\$0	6.3M kWh/ 33,907 ccf	0	5,492 metric tonnes	\$587,527
2014	\$7,893,625	\$6,393,564	\$0	\$481,007*	\$0	\$0	5.0M kWh/ 17,431 ccf	0	3,595 metric tonnes	\$367,480
<b>TOTAL</b>	<b>\$22,612,956</b>	<b>\$17,421,169</b>	<b>\$1,707,737</b>	<b>\$924,753*</b>	<b>\$1,137,306</b>	<b>\$402,937</b>	<b>15.1M kWh/ 167,551 ccf</b>	<b>100,000 kWh</b>	<b>12,524 metric tonnes</b>	<b>\$1,404,351</b>

# What is Monitoring & Verification

- Comparing Baseline Performance to Post-Project Performance.



# Why do Monitoring and Verification?

- Detect and Fix Any Under-Performance in the Project
- Determine Whether the Vendor is Meeting the Guarantee
- Document and Communicate Success



# Monitoring and Verification

- When Construction is Finished –
  - You've Still Got 20 Years to Go.
- Over Time, Things Change



# Monitoring and Verification

## 5 Options

- 1) Stipulated Savings – The parties agree on how much energy an ECM will save.
  - Suitable For: Measures with Known Parameters.
  - Example: Lamp Replacements with Known Burn Hours
  - Advantages – No Work; No Cost
  - Disadvantage – No Performance Data; No Performance Guarantee



# Monitoring and Verification Options

- Option A – Measure performance for 1 unit, and compute total savings
  - Suitable when: performance of equipment must be measured, but won't vary over time.
  - Example: New Types of Lighting Fixtures
  - Advantages: Proves that Equipment Meets Specs
  - Disadvantages: Doesn't Measure Performance Over Time



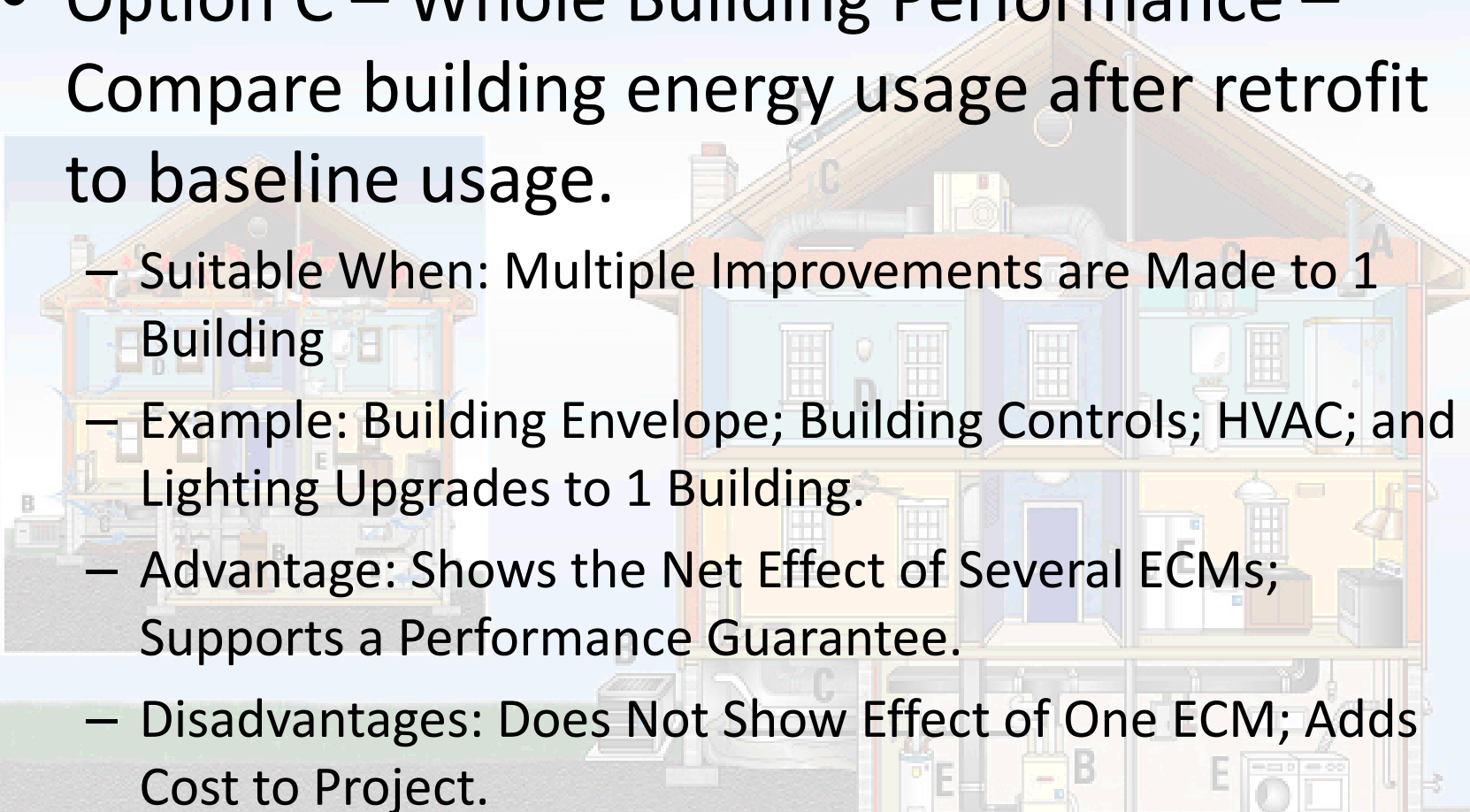
# Monitoring and Verification Options

- Option B – Long-term measurement of an ECM's performance vs. Baseline Data
  - Suitable When: Performance Data is Needed on a Specific ECM, and Measurement is Feasible
  - Example: New Hot Water Heater, with Separate Meter for Energy Usage.
  - Cincinnati has Never Used Option B.
  - Advantages: Documents Value of One ECM
  - Disadvantages: Requires Dedicated Equipment; Often Impractical; Performance Guarantees are Not Usually Measure-Specific.





# Monitoring and Verification Options

- Option C – Whole Building Performance – Compare building energy usage after retrofit to baseline usage.
    - Suitable When: Multiple Improvements are Made to 1 Building
    - Example: Building Envelope; Building Controls; HVAC; and Lighting Upgrades to 1 Building.
    - Advantage: Shows the Net Effect of Several ECMs; Supports a Performance Guarantee.
    - Disadvantages: Does Not Show Effect of One ECM; Adds Cost to Project.
- 

# Monitoring and Verification Options

- Option D – Computer Models Simulate Measurements
  - Cincinnati has Never Used Option D



# Monitoring and Verification Advice

- Think About M&V Up Front – By the Time You Need It, It's Too Late.
- Balance: Usefulness vs. Practicality;  
Value vs. Cost
- Ask “What if?” Ask it a lot.
  - What if energy costs go up or go down; what if building usage goes up, or goes down; what if better technology arrives, or this technology fails; what if the project is delayed, or scope of work changes; etc.
- Understand what risks you bear; and what risks the vendor bears.

# Additional Resources

# City of Cincinnati Fact Sheet

## 2014 Phase 3 Energy Services Performance Contracting

### Background

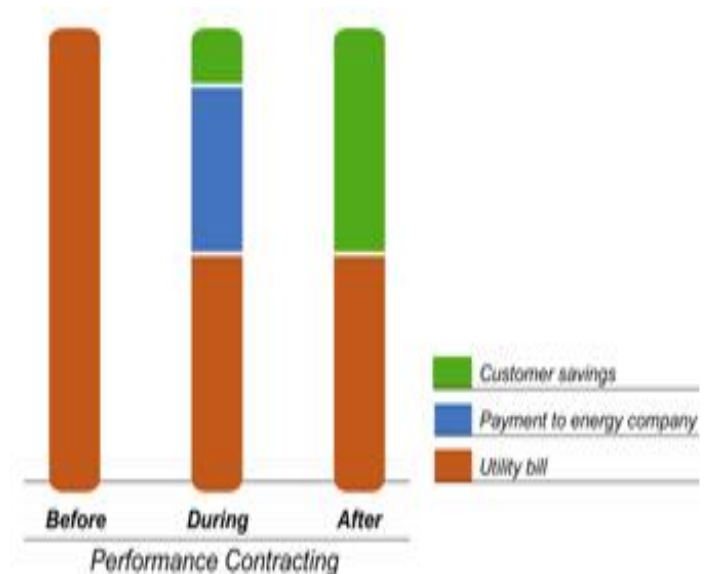
Like most cities, the City of Cincinnati is challenged by its aging facilities and limited capital funds. Most of the facilities were built at a time when energy and operational expenses were not a major factor in building design and most are now in need of technology and comfort upgrades.

### What is Energy Services Performance Contracting (ESPC)?

State of Ohio enabling legislation introduced in 1994 (and amended in 2008) allows municipalities to fund capital improvements with energy and operational savings through a guaranteed performance based contract. The installation of energy savings measures can be financed by Ohio municipalities over the average useful life of the equipment, typically 15 years, and is not included in the calculation of the municipality's net indebtedness.

### How has the City of Cincinnati Historically Used ESPC?

The City owns/operates nearly 400 buildings. In 2009 (Phase 1) and 2010 (Phase 2), energy audits of key buildings were conducted at 88 buildings, including City Hall, the Duke Energy Convention Center, and facilities operated/managed by Fire, Police, Recreation, Health, Parking, Lunken Airport, and Public Services. Examples of the work performed included significant HVAC upgrades, including installation of energy efficient boilers, cooling towers, air handling units, and energy-efficient infrared radiant heat. Other work included comprehensive lighting upgrades, installation of new building automation systems, building envelope sealing (weather-stripping, and window and door seals), a photovoltaic (solar) system at the Convention Center, and a vegetated roof at City Hall.



During this time, nearly \$15 million of energy efficiency upgrade projects were leveraged by about \$1.7 million of City capital and \$1.1 million of Energy Efficiency and Conservation Block Grant funding. When completed, City energy use was reduced by more than 10.1 million kWh and energy costs were reduced by over \$1 million per year. Phase 1 and 2 projects continue to generate 100,000 kWh of renewable energy annually, and reduce greenhouse gas emissions by 8,929 metric tonnes annually.

## Summary of the Energy Services Performance Contract Phase 3:

In the time since the Phase 1 and Phase 2 were completed, the cost of light emitting diode (LED) lighting technology has dropped significantly, making LED lighting retrofits “cash-flow” positively in an ESPC scenario. The City’s ESPC contractor re-evaluated exterior lighting on the City buildings from Phases 1 and 2, and also inventoried a portion of the City’s electric street lights for retrofits or replacement. The largest component of Phase 3 is the retrofitting of City street lights for the Department of Transportation and Engineering (DOTE). Also included in Phase 3 is the replacement of exterior lighting on City buildings, and the interior and exterior lighting at the Duke Energy Convention Center, including the Cincinnati “Icon” sign visible from Interstate 75. Phase 3 also includes heating, ventilation and air conditioning (HVAC) upgrades at the City’s Traffic and Road Operations Garage, and the purchase of ten hybrid Fleet vehicles. Based on the total project cost, it is expected that 86 jobs have been created or retained as part of Phase 3.

## How did the City Fund the Performance Contracts and what are the expected Environmental and Financial Benefits?

Year	Total Project Costs	City Financed w/Energy Savings	City Capital	Duke Energy Rebates/State Grants	Federal Grant Funding	State Grant Funding	Annual Energy Reduction	Annual Energy Generation	Annual GHGE Reduction	City’s Annual Energy Savings
2009	\$5,908,691	\$4,511,652	\$469,000	\$190,172	\$334,930	\$402,937	3.8M kWh/ 116,213 ccf	100,000 kWh	3,437 metric tonnes	\$449,344
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\*Duke rebates pending

## What Benefits Does the City Expect as a Result of Implementing the Performance Contracts?

- A total guaranteed minimum annual City energy savings of **\$1,404,351**.
- Upgraded facilities that reduce energy use and require less maintenance.
- More comfortable conditioned air spaces.
- Additional hybrid Fleet vehicles.
- Safer outdoor environments.
- Reduction of greenhouse gas emissions at City facilities.

# Discussion