

Two Decades of Energy Efficiency: Hamilton County, OH Facilities

Ralph Linne & Garyne Evans



[amesco.com](https://www.ameresco.com)



Presenters



Garyne Evans, PE CEM

Senior Director – Development Engineering

- 33 years of experience
- 17 years with Ameresco
- Over \$234 million in energy projects
- 12 projects in Hamilton County and City of Cincinnati



Ralph Linne, MBA

Hamilton County Director of Facilities

- Manages over 200 employees
- Oversees 25 facilities with over 3.5 million sq. ft.
- Annual operations budget of over \$26 million

Hamilton County
Facilities



Big Picture – Board of County Commissioners



Over 4,000 properties

- Great American Ballpark
- Paycor (Paul Brown) Stadium
- 8 corrections facilities & courthouse
- 40 garages, parking garages & lots
- 26 offices & mixed-use buildings
- 39 utility or treatment plants
- 17 parks and recreation centers
- 15 commercial, retail & storage
- 7 schools
- 2 hospitals/care centers
- 3,000+ roads & streets

Hamilton County Facilities Department

25 facilities managed by Ralph Linne

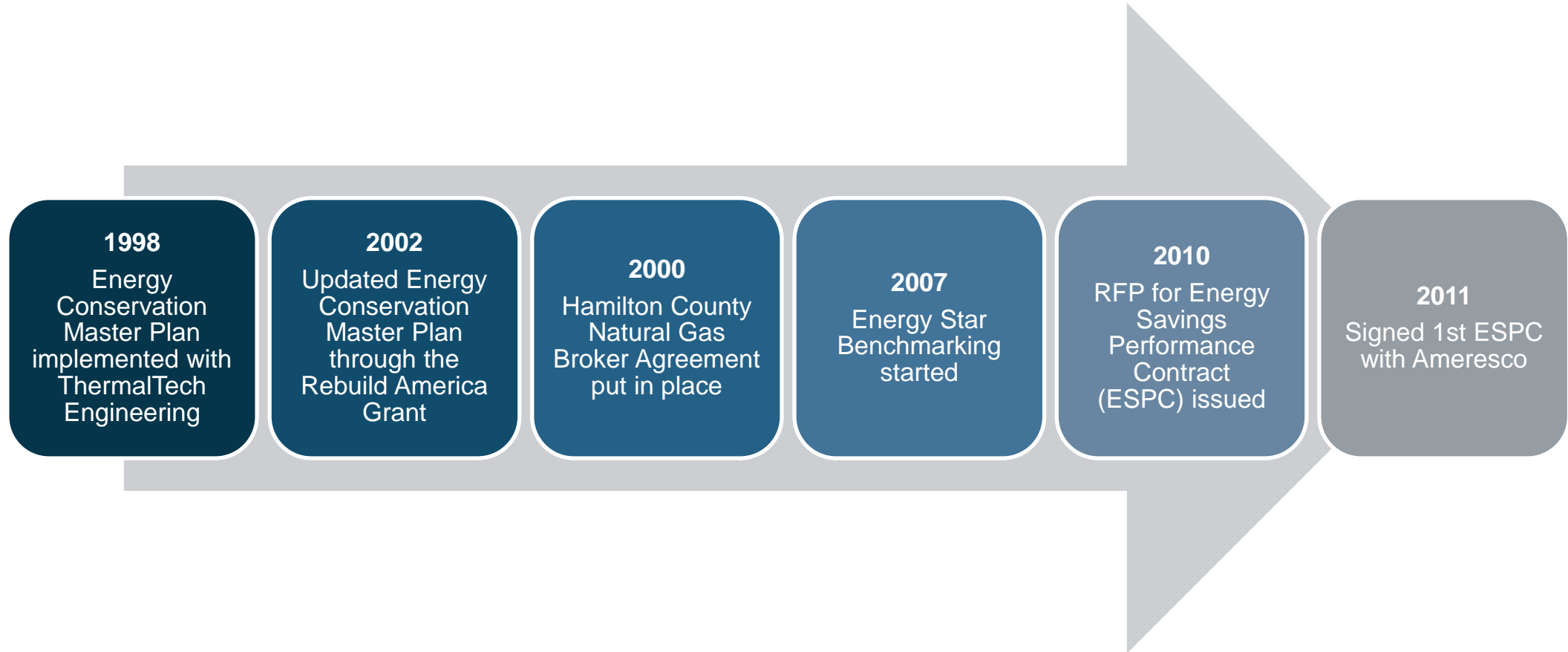
Over 3.5 million square feet

Operational budget of over \$26 million

5-year capital budget of over \$65 million



Early Facilities Department Efforts



Ameresco
Projects



Buildings

- 230 E. 9th Street Building
- Administration Building
- Alms & Doepke
- Parkhaus Garage

Scope

- Lighting Upgrades
- Building Automation Controls Improvements
- Variable Frequency Drives
- Replace Boilers & Water Heaters
- Computer Room AC Heat Recovery
- Domestic Hot Water Heat Pump
- Reline Flue/Restart Boiler Economizers
- New Cooling Tower
- VAV Piping Network
- Condensate Reclaim
- Water Conservation
- Energy Behavior Modification Training



NEW CONDENSING BOILER INSTALLED AT 203 E. 9TH ST



NEW VFD



NEW PARKING GARAGE LED LIGHT FIXTURE

Buildings

- Courthouse
- Justice Center
- 800 Broadway

Scope

- Lighting Upgrades
- Building Automation Controls Improvements
- Variable Frequency Drives
- Water Conservation
- Blowdown Heat Recovery (Courthouse)
- Computer Room A/C Modifications (Courthouse)
- Chiller Replacement (Justice Center)
- Heat Pump Water Heaters (Justice Center)
- Solar Water Heaters (Justice Center)
- Computer Room Consolidation (800 Broadway)
- Boiler Blowdown Control (Courthouse)
- Boiler Burner Replacements (Courthouse)
- Boiler Flue Economizers (Courthouse)
- Chiller Water Economizer (Courthouse)
- Solar Water Heaters (Courthouse)



SOLAR THERMAL PANELS AT THE JUSTICE CENTER



CHILLER AT THE JUSTICE CENTER



BOILER BURNER AT THE COURTHOUSE

Buildings

- Juvenile Detention Center
- 250 William Howard Taft
- 264 William Howard Taft
- 2611 Highland
- Clerk of Courts Records Facility
- Coroner's Facility
- Public Works Garage
- Sheriff's Patrol HQ
- 911 Communications

Scope

- Lighting Upgrades
- Water Conservation
- VFD & Mechanical Upgrades (2020 Auburn)
- Energy Recovery (911 Communications)
- Controls Upgrade (250 William Howard Taft)
- Controls Upgrade (911 Communications)
- Controls & HVAC Upgrade (Sheriff Patrol HQ)
- Controls Upgrade (Clerk of Court Records)
- Controls Upgrade (Public Works Garage)



FLUID COOLER AT 911 COMMUNICATIONS



HIGHBAY LIGHTING AT PUBLIC WORKS GARAGE



CONDENSING WATER HEATER AT JUVENILE DETENTION CENTER

Phase
1

Phase
1A

Phase
2

Phase
4

Phase
5

Phase
6

Phase
7

Phase
8

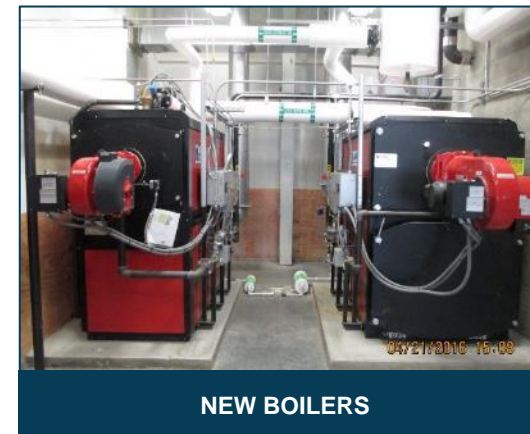
Paycor Stadium

Buildings

- Paycor Stadium (formally Paul Brown Stadium)

Scope

- Lighting Upgrades
- Lighting Control Upgrades
- Water Conservation
- HVAC & HVAC Controls Upgrades
- Boiler Upgrades
- Building Envelope Improvements
- Visiting Locker Room Energy Recovery Ventilator (ERV)
- Solar PV
- Electric Switchgear Room Cooling Improvements
- New Chilled Water Plant
- Electric Heat Trace Project



NEW BOILERS



LOCKER ROOM ERV

Phase
1

Phase
1A

Phase
2

Phase
4

Phase
5

Phase
6

Phase
7

Phase
8

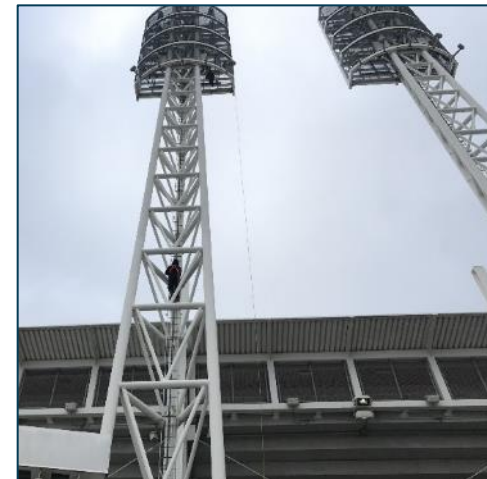
Great American Ball Park

Buildings

- Great American Ball Park

Scope

- Lighting Upgrades
- Water Conservation Improvements
- Chiller System Optimization & Improvements
- HVAC & Controls Upgrades
- Boiler Upgrades



NEW FIELD LIGHTING



NEW BOILER

Phase
1

Phase
1A

Phase
2

Phase
4

Phase
5

**Phase
6**

Phase
7

Phase
8

Buildings

- Todd B. Portune Center for County Government
- William Howard Taft Law Center
- Alms & Doepke Building
- Courthouse
- Justice Center
- 800 Broadway Building
- Juvenile Detention Center
- 250 William Howard Taft Building
- Hamilton County Sheriff Patrol HQ
- Hamilton County Communication Center
- Hamilton County Records Center
- Public Works Garage

Scope

- LED Lighting Upgrades
- AHU Replacement (Portune Center)
- VAV Control Upgrades (Portune Center)
- Replace Fire Alarm System (Portune Center)
- Hot Water Boiler Upgrades (Justice Center)
- Replace Steam Boiler (Justice Center)
- Modernize Elevators (Justice Center)
- Replace Chillers (Juvenile Detention Center)
- Retro-Commissioning (several buildings)



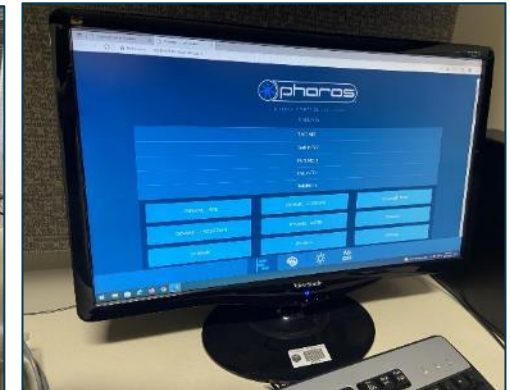
LED FIXTURES AT
ADMINISTRATION BUILDING



FIRE ALARM SYSTEM AT
PORTUNE CENTER



CHILLER AT JUVENILE DETENTION
CENTER



LIGHTING CONTROL SYSTEM AT
COURTHOUSE

Paycor Stadium

Buildings

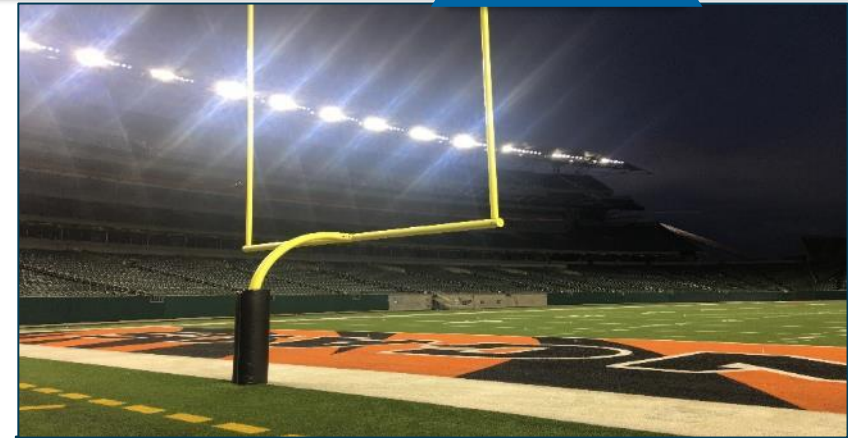
- Paycor Stadium (formally Paul Brown Stadium)

Scope

- Field Lighting Upgrades, includes a change order to add colored LEDs



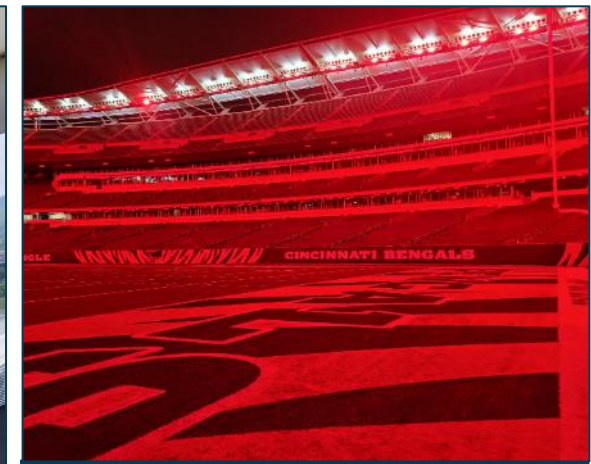
ORIGINAL FIELD LIGHTING AT PAYCOR STADIUM (TOP ROW AND BOTTOM ROW)



NEW FIELD LIGHTING



NEW LED FIELD LIGHTS



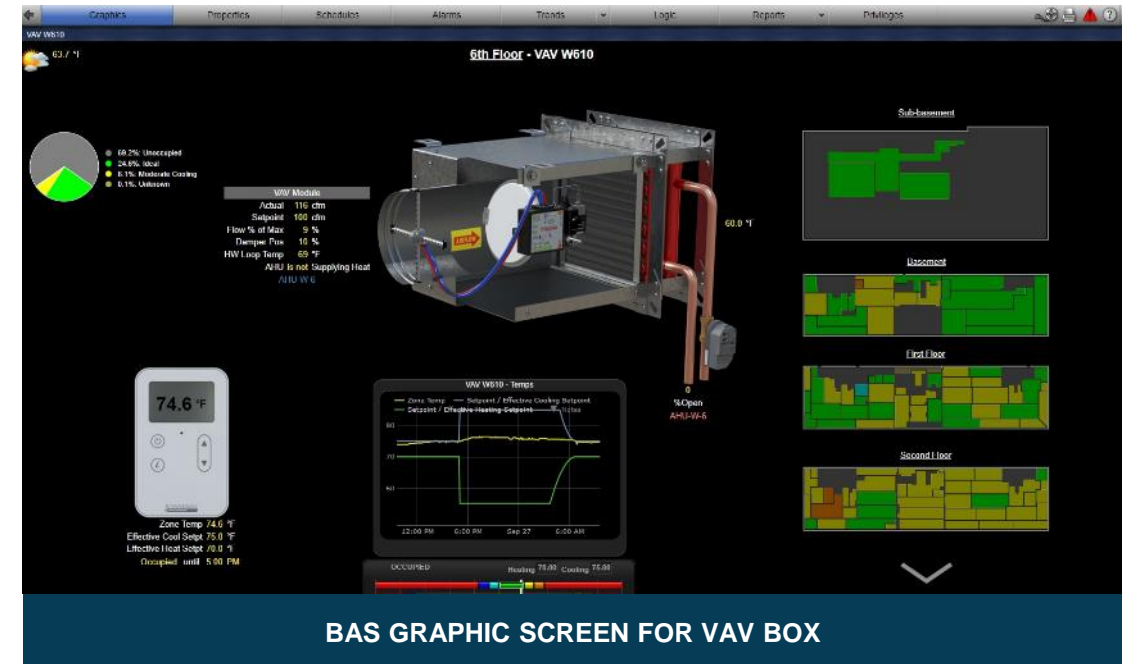
STADIUM WITH NEW COLORED LEDS

Buildings

- Alms & Doepke Building

Scope

- LED Lighting Upgrades
- Lighting Control Upgrades
- HVAC Pneumatic to DDC Upgrades
- Chilled Water Pumping Upgrades
- Elevator Equipment Room AC



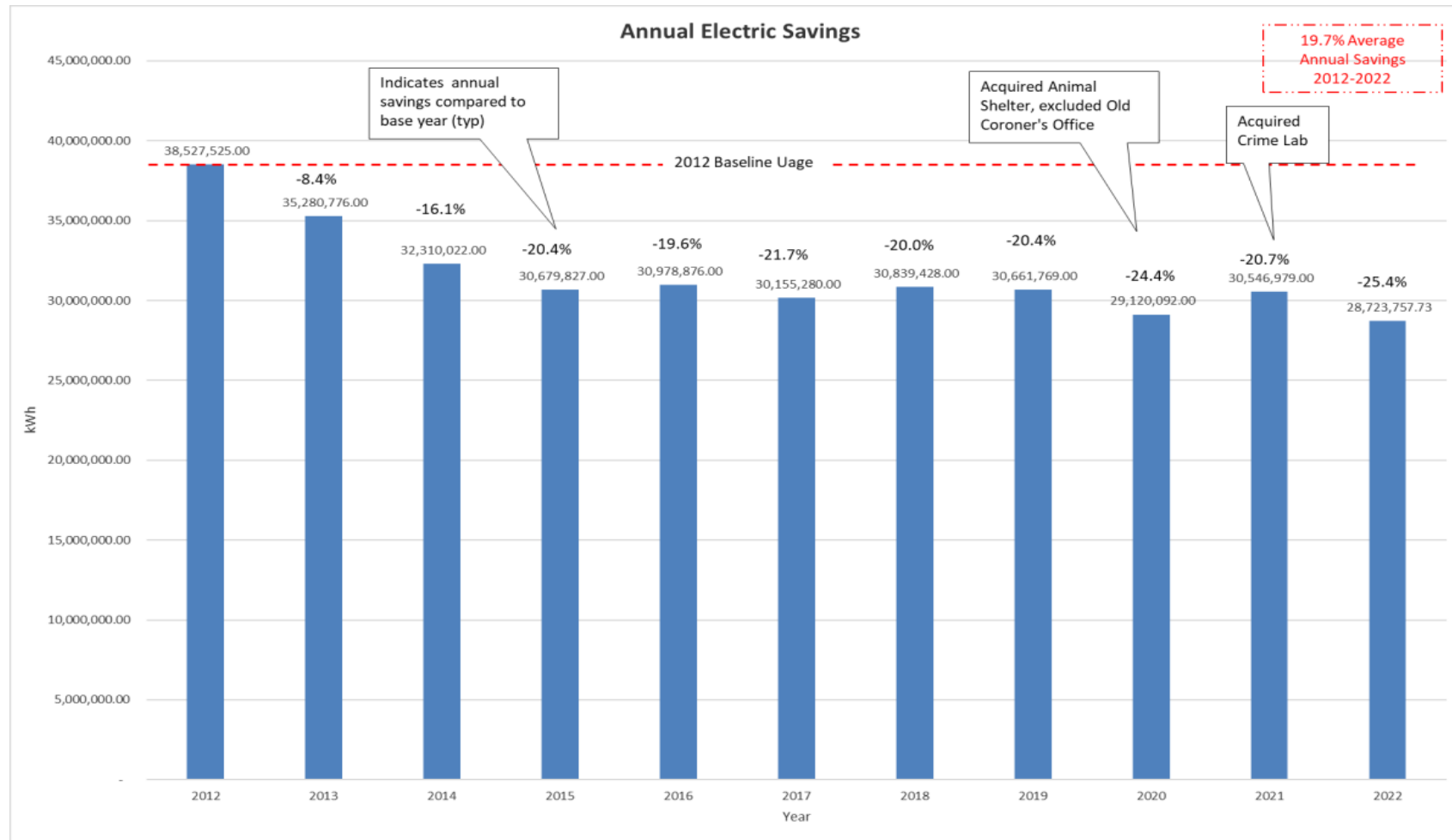
Ameresco ESPC Project Results

Phase	# of Bldgs	Annual Savings					Maintenance (\$)	Guarantee (Years)
		kWh	kW	Therms	kGal	Energy (\$)		
1	4	4,279,181	5,494	23,434	6,370	\$378,434	\$24,374	14
1A	3	4,980,879	11,761	306,865	22,653	\$738,088	\$28,500	14
2	9	1,756,514	2,971	26,362	1,873	\$113,647	\$9,852	14
4	1	14,267,267	20,427	(124,920)	464	\$689,272	\$971,310	15
5	1	4,386,415	20,499	77,179	3,802	\$384,764	\$80,000	20
6	12	2,689,420	6,709	121,048	-	\$265,026	\$118,908	20
7	1	64,403	4,429	457	68	\$384,764	\$80,000	20
8	1	418,458	768	2,717	-	\$51,662	\$11,602	20
Totals	14	34,599,051	76,029	459,504	37,103	\$3,144,420	\$1,335,461	

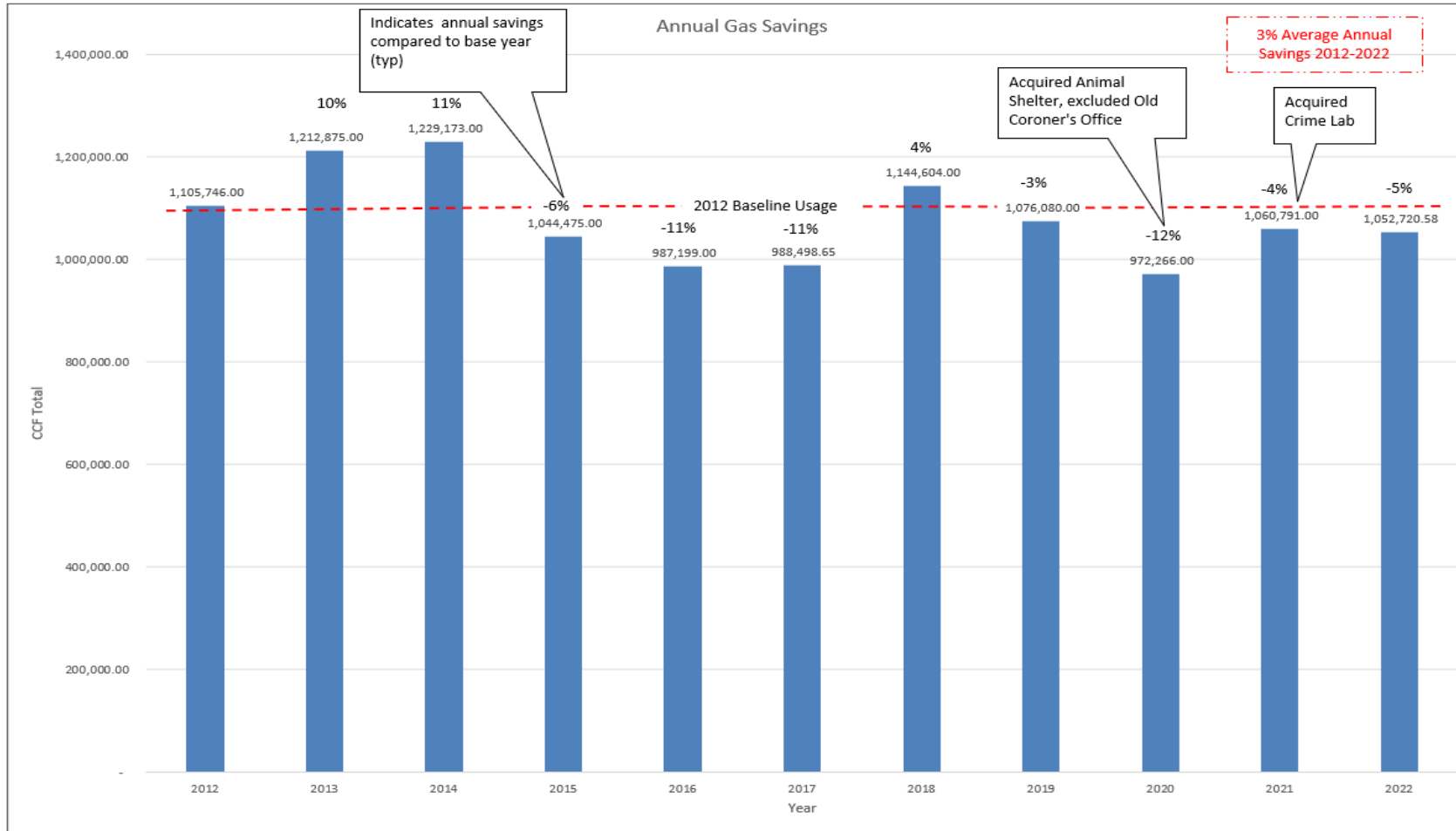
Utility Baseline and Energy Star Performance



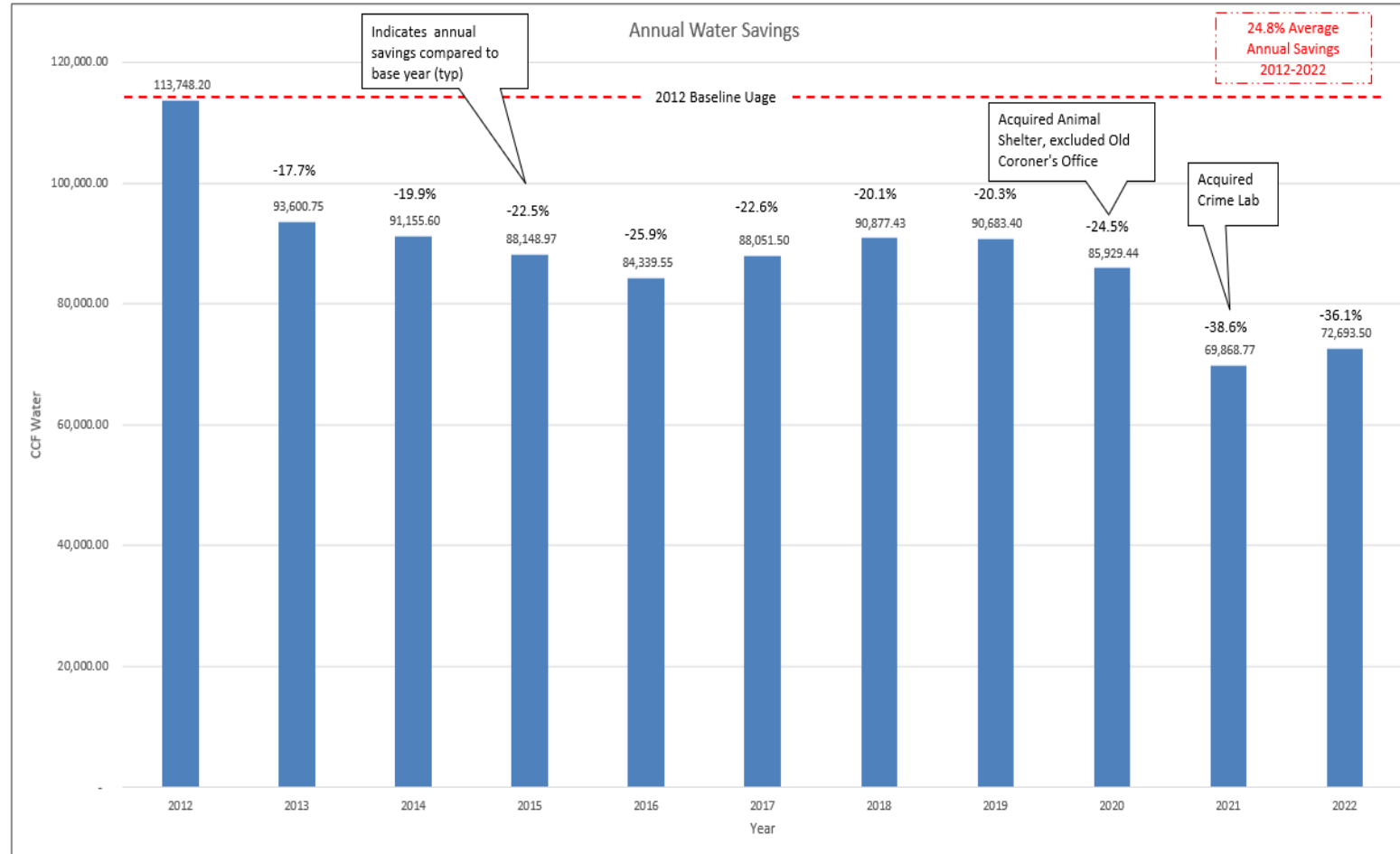
Electric Baseline Trend



Natural Gas Baseline Trend



Water Baseline Trend



Energy Star Metrics Summary

230 E. 9th Street Building

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	54	81	27.0 (50.0%)
Source EUI (kBtu/ft ²)	187.9	128.9	-59.0 (-31.4%)
Site EUI (kBtu/ft ²)	94.4	65.4	-29.0 (-30.7%)
Energy Cost (\$)	358,859.7	199,547.27	-159,312.4(-44.0%)
Total GHG Emissions (kgCO ₂ E/ft ²)	12.8	6.2	-6.6(-51.60%)
Water Use (All Water Sources) (kgal)	Not Available	2,724.6	N/A

250 William Howard Taft

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	52	79	27.0 (51.9%)
Source EUI (kBtu/ft ²)	179.8	123.9	-55.9 (-31.1%)
Site EUI (kBtu/ft ²)	81.7	57.6	-24.1 (-29.5%)
Energy Cost (\$)	91,680.7	47,721.4	-43,959.3 (-47.9%)
Total GHG Emissions (kgCO ₂ E/ft ²)	12.3	5.9	-6.4 (-52.0 %)
Water Use (All Water Sources) (kgal)	Not Available	579.9	N/A

Energy Star Metrics Summary

800 Broadway Building

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	72	89	17.0 (23.6%)
Source EUI (kBtu/ft ²)	131.0	89.3	-41.7 (-31.8%)
Site EUI (kBtu/ft ²)	64.3	45.8	-18.5 (-28.8%)
Energy Cost (\$)	295,661.0	211,900.5	-83,760.4 (-28.3%)
Total GHG Emissions (kgCO ₂ E/ft ²)	7.2	4.3	-2.9 (-40.3%)
Water Use (All Water Sources) (kgal)	5,143.1	6,055.5	-912.4 (-17.7%)

Todd B Portune Center

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	61	91	30.0 (49.2%)
Source EUI (kBtu/ft ²)	215.8	110.9	-104.9 (-48.6%)
Site EUI (kBtu/ft ²)	96.8	44.6	-52.2 (-53.9%)
Energy Cost (\$)	336,479.2	213,799.1	-122,680.2 (-36.5%)
Total GHG Emissions (kgCO ₂ E/ft ²)	13.7	5.2	-8.5 (-62.0%)
Water Use (All Water Sources) (kgal)	3,819.1	1,387.2	-2,431.9 (-63.7%)

Energy Star Metrics Summary

Alms & Doepke

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	46	93	47.0 (102.2%)
Source EUI (kBtu/ft ²)	193.0	106.5	-86.5 (-44.8%)
Site EUI (kBtu/ft ²)	83.9	50.0	-33.9 (-40.4%)
Energy Cost (\$)	496,420.6	225,256.1	-271,164.5 (-54.6%)
Total GHG Emissions (kgCO ₂ E/ft ²)	13.3	5.1	-8.2 (-61.7%)
Water Use (All Water Sources) (kgal)	Not Available	1,694.4	N/A

Courthouse

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	11	41	30.0 (272.7%)
Source EUI (kBtu/ft ²)	286.6	181.6	-105.2 (-36.7%)
Site EUI (kBtu/ft ²)	211.9	129.1	-82.8 (-39.1%)
Energy Cost (\$)	1,159,597.4	762,857.1	-396,740.3 (-34.2%)
Total GHG Emissions (kgCO ₂ E/ft ²)	15.0	8.9	-7.9 (-47.0%)
Water Use (All Water Sources) (kgal)	Not Available	11,125.9	N/A

Energy Star Metrics Summary

Justice Center

Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	50	80	30.0 (60.0%)
Source EUI (kBtu/ft ²)	219.6	137.9	-81.7 (-37.2%)
Site EUI (kBtu/ft ²)	116.8	61.0	-55.8 (-47.8%)
Energy Cost (\$)	785,095.8	736,573.4	-48,522.4 (-6.2%)
Total GHG Emissions (kgCO ₂ E/ft ²)	11.9	6.6	-8.1 (-55.1%)
Water Use (All Water Sources) (kgal)	Not Available	24,834.3	N/A

Juvenile Detention Center

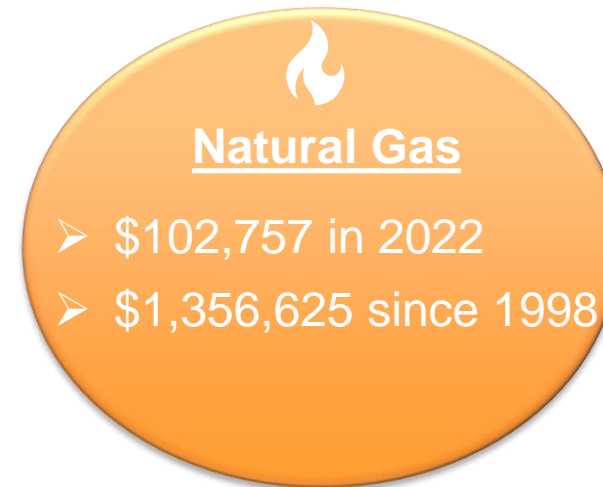
Metric	Energy Baseline (Jan 2007)	Energy Current (Dec 2022)	Change
Energy Star Score (1-100)	52	74	22.0 (42.3%)
Source EUI (kBtu/ft ²)	200.8	151.5	-49.3 (-24.6%)
Site EUI (kBtu/ft ²)	97.5	83.0	-14.5 (-14.9%)
Energy Cost (\$)	214,505.8	152,326.6	-62,179.2 (-29.0%)
Total GHG Emissions (kgCO ₂ E/ft ²)	13.7	7.3	-6.4 (-46.7%)
Water Use (All Water Sources) (kgal)	Not Available	3,521.0	N/A

Hamilton County Results



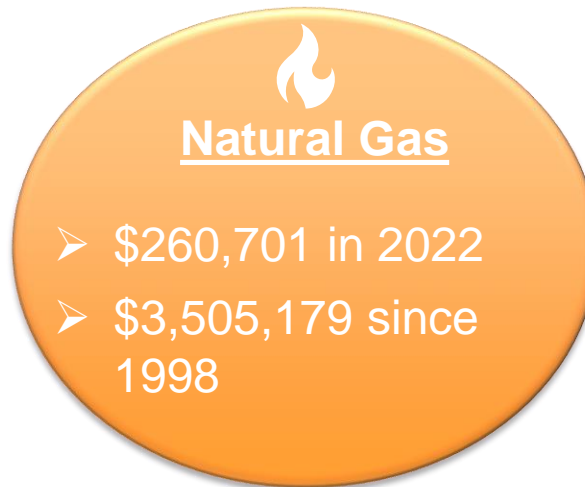
Utility Supply Savings

Accumulated from 1998 through 2022 for electricity and natural gas deregulated purchasing and tariff negotiation



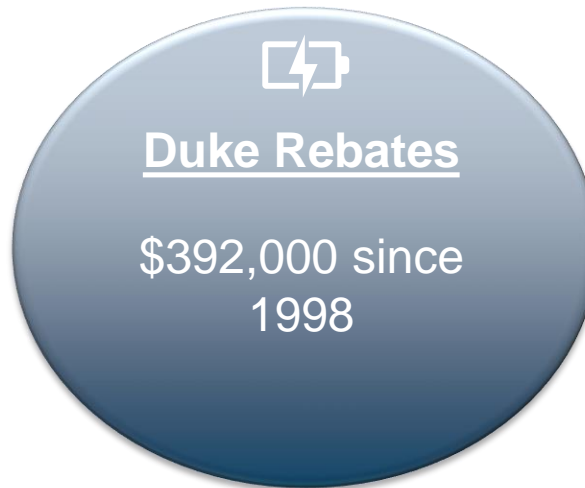
Energy Conservation Savings

Generated from energy conservation through self-improvement, energy audits, and Ameresco performance-contract projects



Utility Rebates & Billing Errors

Include savings from federal grants and utility rebates as well as corrections of billing errors



Hamilton County Savings Summary

Types of Savings	Rate Based	Energy Projects	Rebates	Billing Errors
Amount	\$12,100,000	\$14,200,000	\$3,200,000	\$140,000
<u>\$29,600,000 TOTAL</u>				

Hamilton County Awards & Highlights



- In 2014, the 800 Broadway Building qualified as the 1st County-level government building in Ohio to receive LEED Existing Buildings: Operations and Maintenance (LEED-EB:O+M) certification
- In 2023, the Coroner Office and Crime Lab received LEED v4 BD+C: New Construction Certification
- The County has 5 buildings that qualified for an award from the Energy Star Program in 2022
 - ✓ 230 E. 9th Street Building with a score of 81
 - ✓ 250 William Howard Taft with a score of 79
 - ✓ Todd B. Portune Center with a score of 91
 - ✓ 800 Broadway Building with a score of 89
 - ✓ Alms & Doepke Building with a score of 99



- The County has received the following awards:

- ✓ ARCHIBUS Inc. presented the **Energy Efficiency Award** to the Department of County Facilities
- ✓ The *Building Operating Management* editorial team has selected the Department of County Facilities to receive **FMXcellence Recognition** at the National Facilities Management & Technology Conference.



Hamilton County Awards & Highlights



➤ The County has received the following awards:

- ✓ Department of County Facilities received **Ohio Governor's Award for Excellence in Energy Efficiency** for the *Five-Year Energy Conversation Program for County Facilities*.
- ✓ *The Buildings* editorial team selected the Department of County Facilities to be included in **Who's Who 2009: Leaders in Energy Management and Sustainability**. They stated “*This was one of a dozen organizations whose practices in energy management and sustainability have resulted in significant reductions in energy usage & operating costs.*”
- ✓ BOMA Cincinnati Chapter and Duke Energy presented the Department with three awards for energy efficiency as part of the **Cincinnati Kilowatt Crackdown Campaign**. The awards were for 2nd and 3rd place for “Most Improved” and 2nd place for “Most Energy Efficient”
- ✓ The *Business Courier* and USGBC – Cincinnati Chapter selected Department of County Facilities as a Finalist in their 4th, 5th and 6th annual **Green Business Awards** programs, celebrating people, companies, and organizations that are demonstrating leadership in sustainable practices at a variety of facilities and projects.
- ✓ Building Owners and Managers Association (BOMA) recognized the County Courthouse and the 800 Broadway Building with **The Office Building of the Year (TOBY)** award in the Government Category at the North Central Regional Level. These awards were for the best Government facility in a five-state region.
- ✓ Department of County Facilities receives the **Ohio Historic Preservation Office's Award Merit** for the *Steward of the Post Times-Star Building at 800 Broadway*.

Hamilton County Awards & Highlights



➤ Ralph has received the following awards and honors:

- ✓ Recipient of the **McMaster Scholarship** from Ohio College of Applied Science – UC
- ✓ Member of the **first graduating class in Construction Management** from the Ohio College of Applied Science – University of Cincinnati
- ✓ Selected by *Facility Executive* editorial team as their **Facility Executive of the Year**
- ✓ Inducted into the first class of the **ARCHIBUS Hall of Fame** - *“This was awarded to individuals demonstrate consistent and outstanding facility management strategies resulting in improved quality of service and facility effectiveness, and their efforts contribute to the overall profitability of their organizations or those which they serve.”*
- ✓ Recipient of the Archibus **Golden Award** *“Awarded to an individual whose real estate, infrastructure, and facilities management practices contribute to creating and managing productive work environments, and support objectives of the organization’s business plan. They demonstrate outstanding management strategies resulting in improved quality of service and effectiveness of the portfolio performance.”*
- ✓ Honored by Governor of the Commonwealth of Kentucky as a member of **Honorable Order of Kentucky Colonels**



Thank You

Garyne Evans

Sr. Director – Development Engineering

Ralph Linne

Hamilton County Director of Facilities