



# Henderson County Schools South Middle School HVAC Solutions 03-18-2024



# Year 1 Savings

*Bend Gate ES*



*Thelma B. Johnson – ELC*



*Central Academy*



*South Middle School*



*Henderson County Sr. High*



*South Heights ES*



*New Jefferson ES*

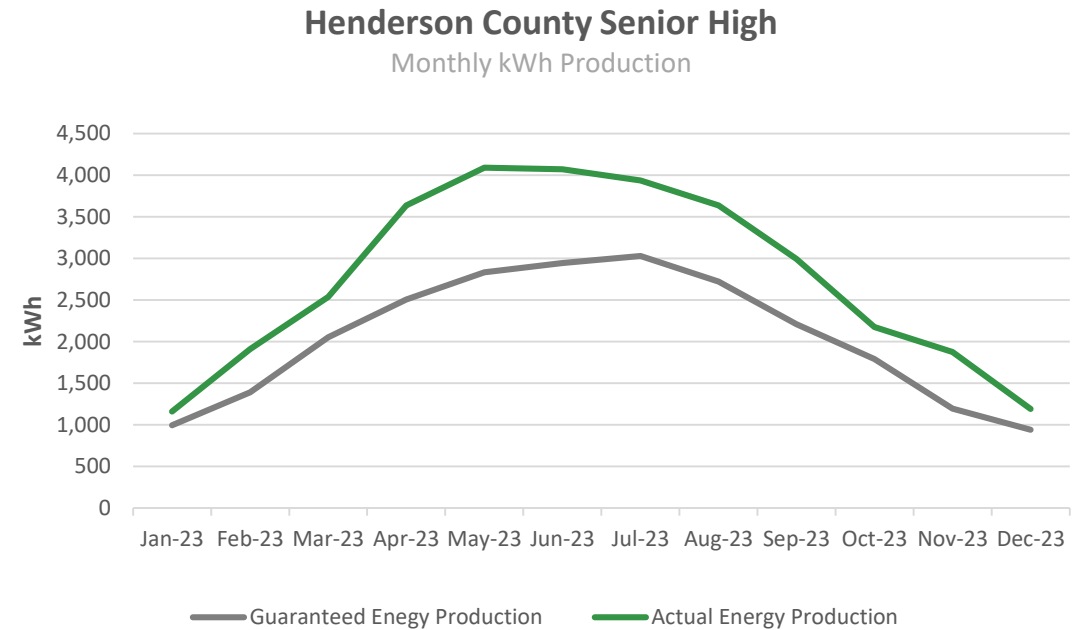


*North Middle School*



# Year 1 Savings

District Wide Results			
Month	Guarantee Production kWh	Actual Production kWh	Excess Savings kWh
Jan-23	6,378	6,817	439
Feb-23	8,898	12,086	3,188
Mar-23	13,135	15,924	2,789
Apr-23	16,057	22,831	6,774
May-23	18,131	25,616	7,485
Jun-23	18,844	25,481	6,637
Jul-23	19,402	24,748	5,346
Aug-23	17,417	22,840	5,423
Sep-23	14,139	20,077	5,938
Oct-23	11,463	14,455	2,992
Nov-23	7,649	11,973	4,324
Dec-23	6,021	7,554	1,532
<b>Totals</b>	<b>157,534</b>	<b>210,400</b>	<b>52,866 (+34%)</b>



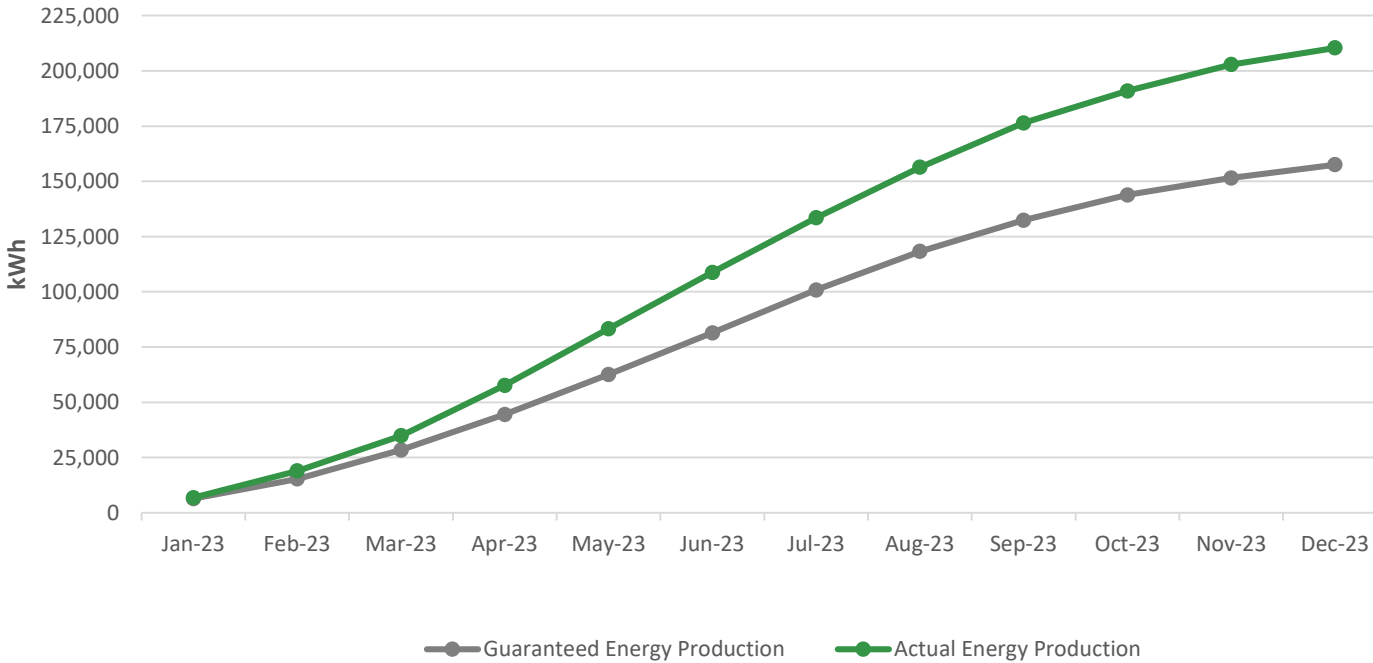
**Every month had extra solar production!**



# Year 1 Savings

## District Wide Results

Annual kWh Production



**34%  
Additional  
Production!**

**Guaranteed Year 1 Savings  
\$163,148**

**Actual Year 1 Savings  
\$206,637**



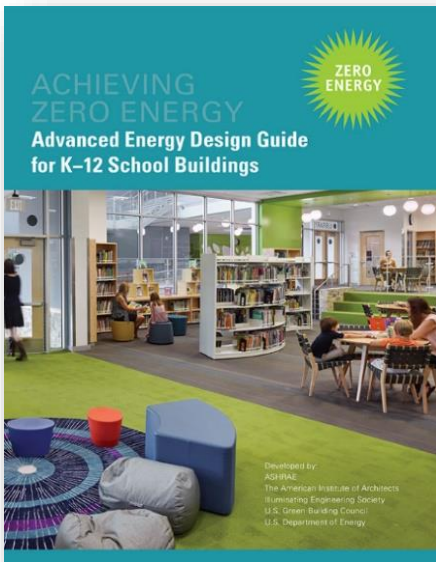
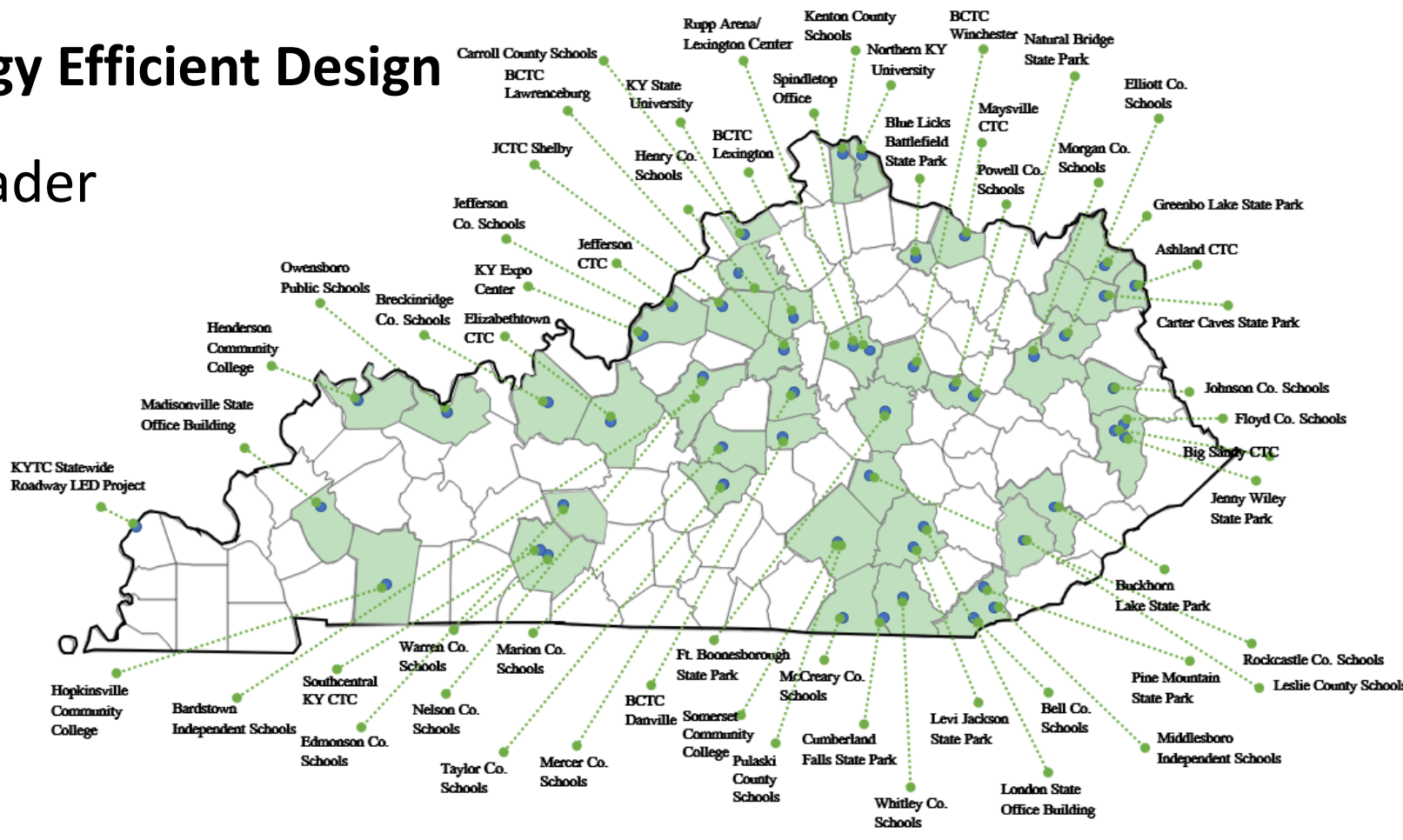


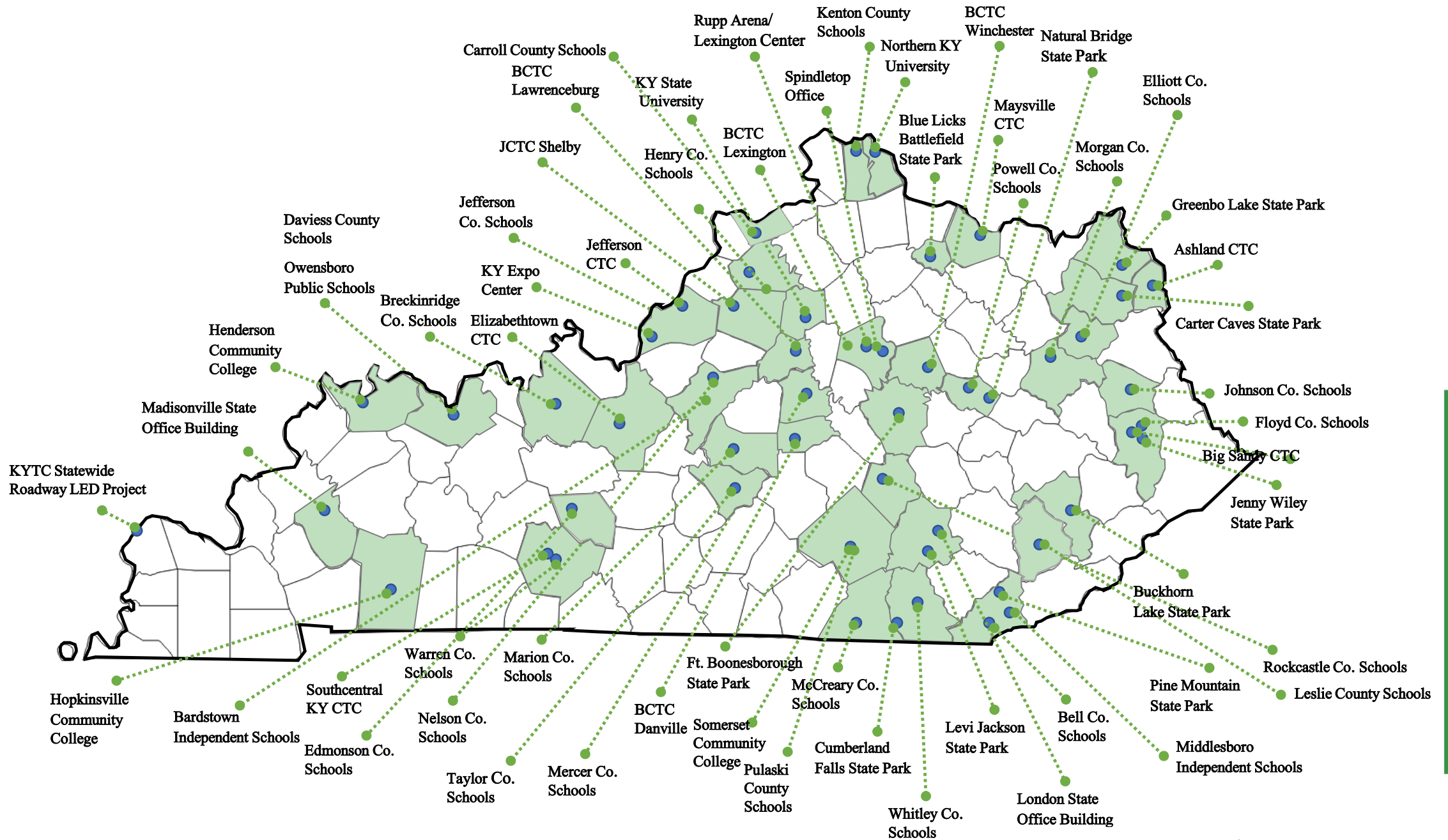


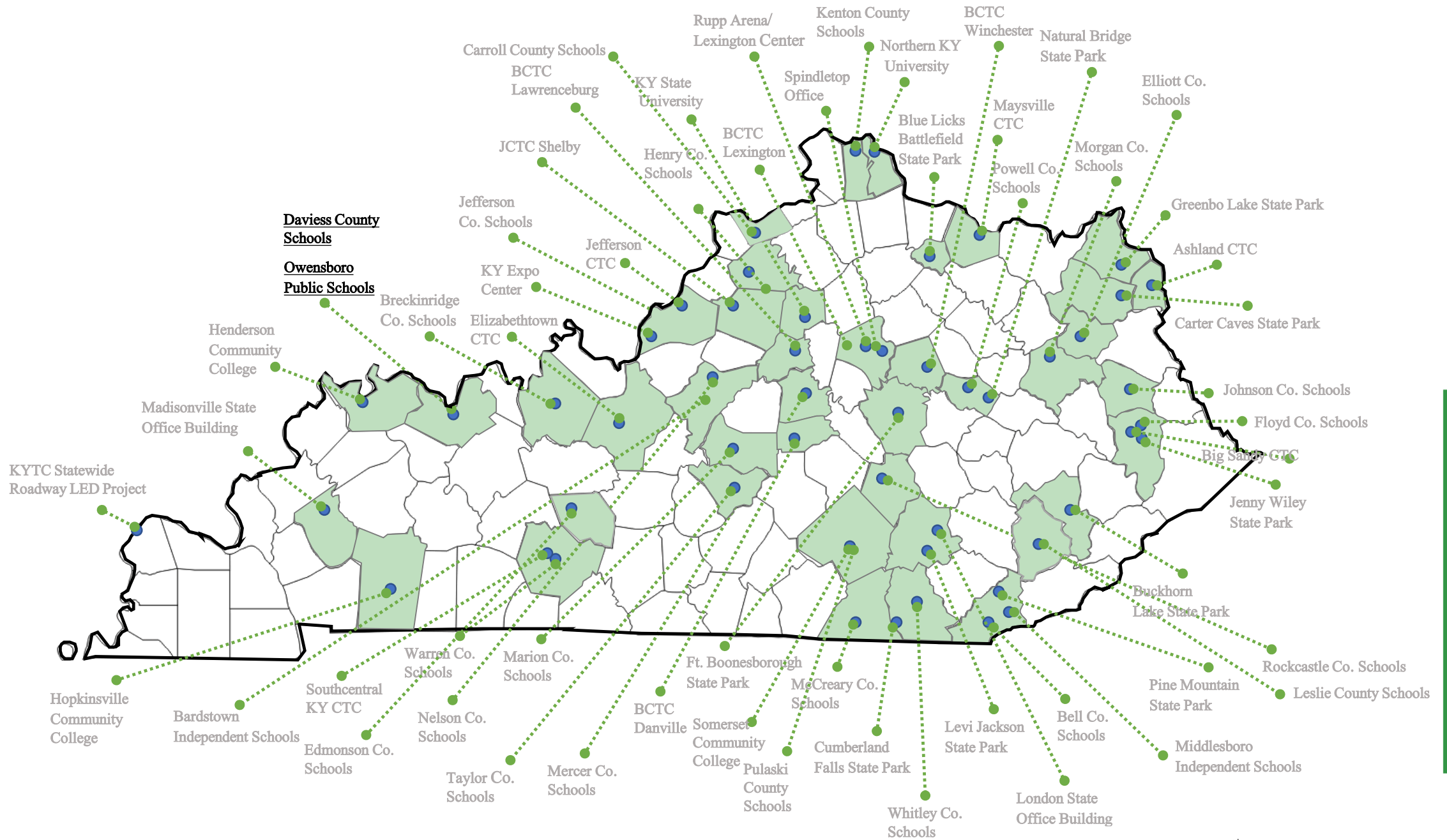
# National Leader in Energy Efficient Design

KY Market Leader

*3 of 6 Case Studies in Advanced Energy Design Guide for K-12 Schools are CMTA designs!*







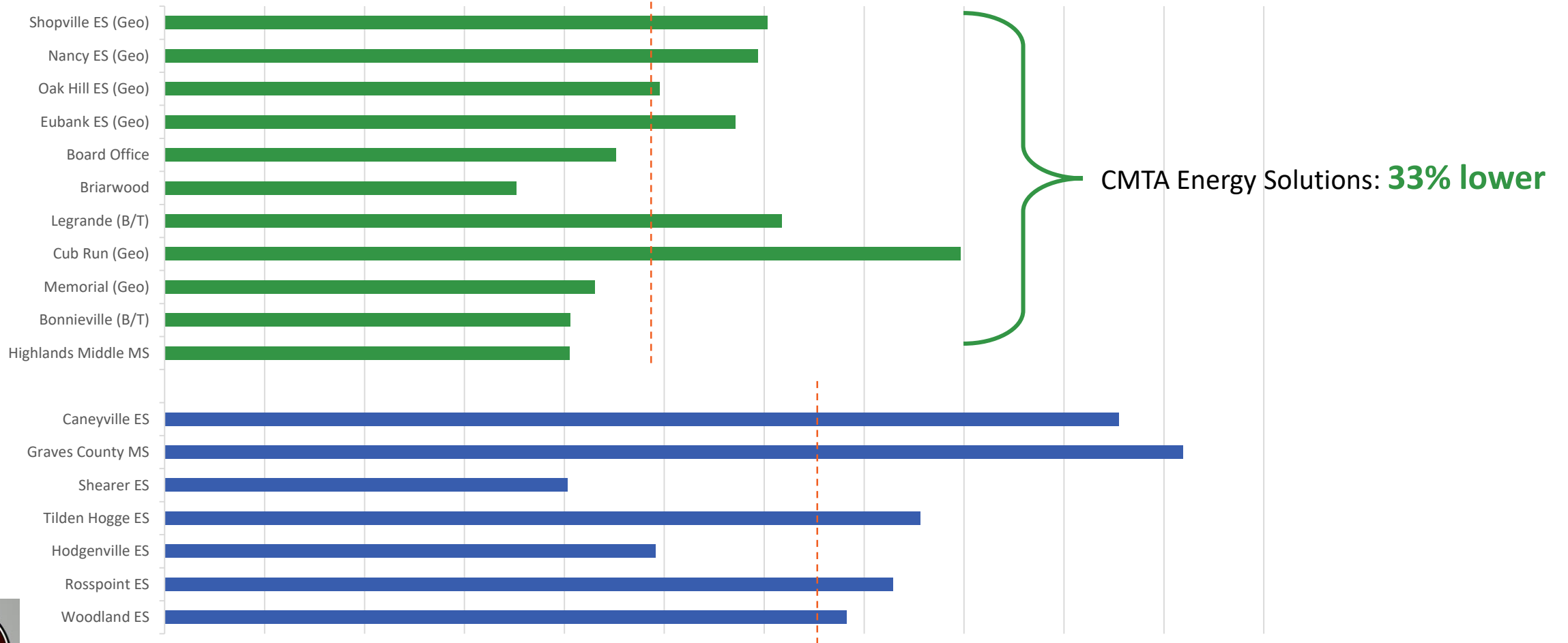
**Daviess County Schools**

**Owensboro Public Schools**



# 2023 Cost Comparison

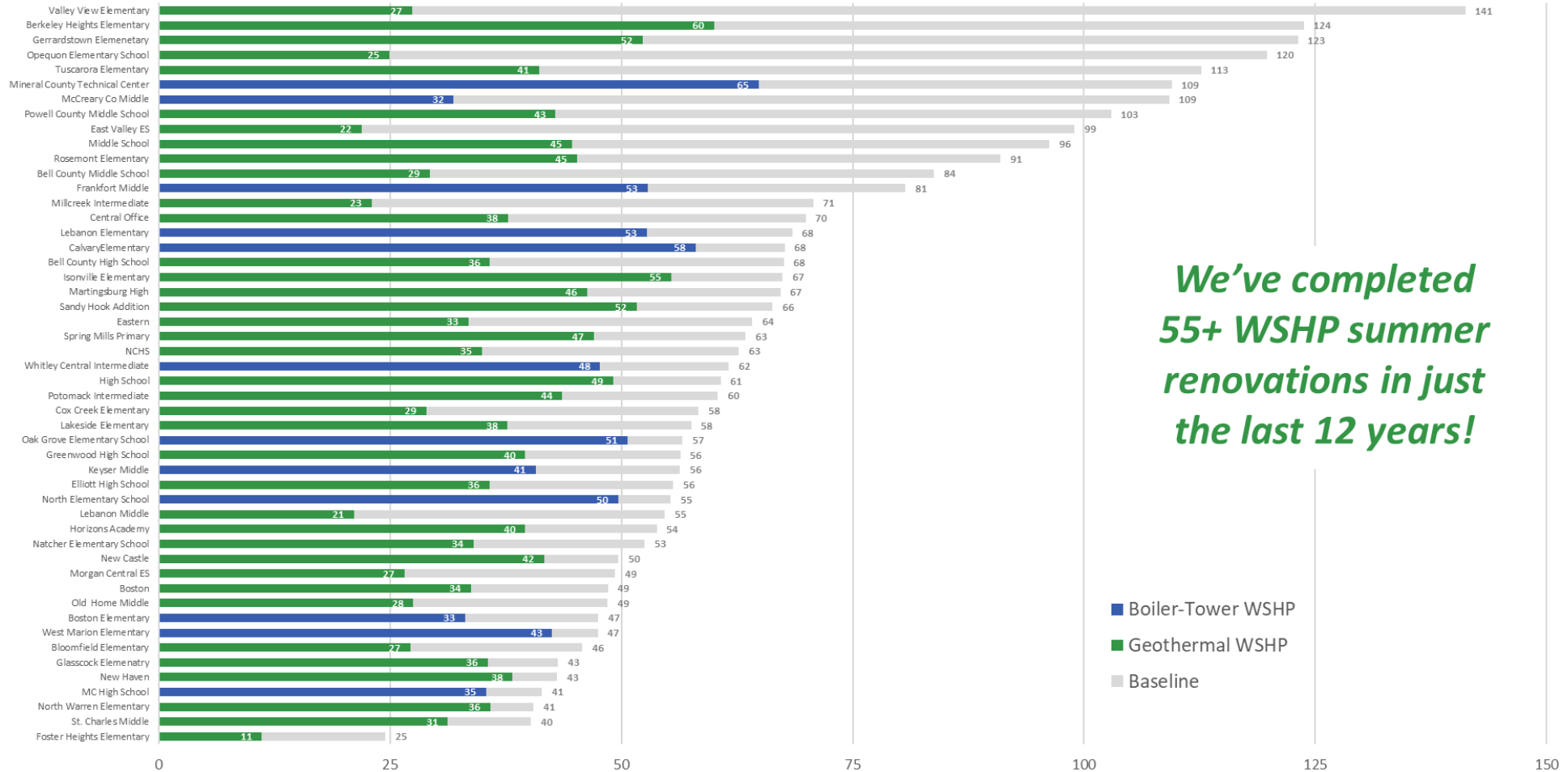
2023 KDE HVAC Renovations \$/Sqft





# Summer Renovations

## CMTA WSHP Summer Renovations - EUI



*We've completed 55+ WSHP summer renovations in just the last 12 years!*

■ Boiler-Tower WSHP  
 ■ Geothermal WSHP  
 ■ Baseline



# Summer Renovations – 100% On-time, 100% On-budget

## COMPLETE HVAC SYSTEM REPLACEMENTS - SUMMER BREAK 2023

Building	Location	SF	Demolished System	New System
Viking Elementary School	Grand Forks, ND	38,219	Steam UVs	4-pipe DOAS, Induction displacement units and chilled beams, air-cooled chiller and boiler plant, controls
Sissonville High School	Sissonville, WV	108,650	4-pipe UVs, Gas/Dx RTUs	Geothermal WSHP
South Charleston High School	South Charleston, WV	141,000	Gas/DX RTUs, VAVs w/ elec RH, 2-pipe and 4-pipe FCUS	Gas/DX RTUs, 4-pipe VAV AHUs and FCUs w/ DOAS
Algonkian Elementary	Sterling, VA	67,094	4-Pipe Multi-Zone RTU w/FPVAV	4-Pipe Multi-Zone RTU w/FPVAV
Cool Spring Elementary	Leesburg, VA	67,139	4-Pipe Multi-Zone RTU w/FPVAV	4-Pipe Multi-Zone RTU w/FPVAV
Briarwood Elementary School	Bowling Green, KY	79,727	Boiler/Tower WSHPs	Geothermal WSHP
Warren County Board Office	Bowling Green, KY	14,305	Geothermal WSHP	Geothermal WSHP
Ft. Thomas Middle School	Ft. Thomas, KY	98,088	4-Pipe AHUs Boiler/Chiller	4-Pipe VAV AHU with new Boiler/Chiller
Bonnieville Elementary	Bonnieville, KY	40,568	Boiler/Fluid Cooler, Unit Ventilators, & WSHPs	Boiler/Tower, Twinned Console HPs, WSHPs, DOAS
Cub Run Elementary	Cub Run, KY	37,008	Boiler/Fluid Cooler, Unit Ventilators, & WSHPs	Geothermal, Twinned Console HPs, WSHPs, DOAS
Memorial Elementary	Hardyville, KY	54,238	Boiler/Fluid Cooler, Unit Ventilators, & WSHPs	Geothermal, Twinned Console HPs, WSHPs, DOAS
LeGrande Elementary	Horse Cave, KY	31,993	Boiler/Fluid Cooler, Unit Ventilators, & WSHPs	Boiler/Tower, Twinned Console HPs, WSHPs, DOAS
Stewartsboro Elementary - Phase 1	Stewartsboro, TN	64,000	DX Unit Ventilators	VRF with DOAS
Rockvale Elementary - Phase 1	Rockvale, TN	70,000	DX Unit Ventilators	VRF with DOAS
Lakewood Elementary	Buchanan TN	22,000	DX Split Systems	HP Packaged Units
Rockvale Elementary School	Rockvale, TN	45,400	DX Unit Vents	VRF w/ DOAS
Stewartsboro Elementary School	Smyrna, TN	42,240	DX Unit Vents	VRF w/ DOAS
Queens University - Belk Chapel	Charlotte, NC	18,076	4-Pipe AHUs	4-Pipe AHUs
Queens University - Dana Hall	Charlotte, NC	54,387	4-Pipe AHUs	4-Pipe AHUs
Queens University - Morrison Hall	Charlotte, NC	38,714	4-Pipe AHUs	4-Pipe AHUs
Queens University - McEwen Hall	Charlotte, NC	24,647	4-Pipe AHUs	4-Pipe AHUs
Queens University- Jernigan Hall	Charlotte, NC	19,077	4-Pipe AHUs	4-Pipe AHUs
Fort Washington Elementary	Ft. Washington, PA	90,350	2-pipe Unit Ventilator	Geothermal WSHP
Oak Hill Elementary	Somerset, KY	63,672	Geothermal WSHP	Geothermal WSHP
Shopville Elementary	Somerset, KY	48,507	Geothermal WSHP	Geothermal WSHP
Eubank Elementary	Eubank, KY	46,085	Geothermal WSHP	Geothermal WSHP
Highlands Middle School	Fort Thomas, KY	98,088	Chiller, Cooling Tower, Boilers, Pumps, ERV	Chiller, Cooling Tower, Condensing Boilers, Variable Primary HW/CHW, ERVs, VRF System in Admin, Controls Replacement
Nancy Elementary	Nancy, KY	40,809	Geothermal WSHP	Geothermal WSHP
	<b>Total</b>	<b>1,564,081</b>		



# Summer Renovations – 100% On-time, 100% On-budget

## COMPLETE HVAC SYSTEM REPLACEMENTS - SUMMER BREAK 2022

Building	Location	SF	Demolished System	New System
Mt Vernon Elementary School	Mt Vernon, KY	77,658	WSHPs, Fluid Cooler, OA units	WSHPs, Fluid Cooler, ERVs, Controls
Dutch Fork Elementary School	Irmo, SC	98,000	NG/DX RTUs	NG/DX RTUs
Carroll County High School	Carrollton, KY	82,660	2-pipe Unit Ventilators	Geothermal WSHP
West Marion Elementary School	Loretto, KY	43,219	Boiler/Tower Unit Ventilator and WSHP	Geothermal WSHP w/ DOAS
Oxford Intermediate School	Oxford, MS	84,586	RTU, Split System, ERVs	RTU, Split System, DOAS
West Side Middle School	Charleston, WV	139,254	4-pipe FCU and single-zone Gas/DX RTUs	Geo WSHP
Carver Career Center	Charleston, WV	96,416	multi-zone and single-zone gas/DX RTUs	single-zone Gas/DX RTUs and VAV Gas/DX RTUs
Grandview Elementary School	Charleston, WV	26,017	4-pipe UV	4-pipe UV w/ high-efficiency chiller/boiler plant
Piedmont Elementary School	Charleston, WV	42,688	multi-zone 4-pipe AHUs	VAV with HW reheat
Sissonville High School Phase 1	Charleston, WV	43,460	single-zone Gas/DX RTUs and 4-pipe UV	Geothermal WSHP
Kanawha City Elementary School	Charleston, WV	27,726	Gas/DX RTUs	single-zone Gas/DX RTUs
Sunset Avenue Elementary School	Clinton, NC	24,953	WSHPs	2-Stage WSHPs and Refurbished Cooling Tower
Greeneville Middle School	Greeneville, TN	97,400	4-pipe UV, DX ERU	Boiler/tower WSHP, Split system, DOAS
<b>Total</b>		<b>884,037</b>		

## COMPLETE HVAC SYSTEM REPLACEMENTS - SUMMER BREAK 2021

Building	Location	SF	Demolished System	New System
Elk Elementary School	Charleston, WV	86,000	Boiler/Tower WSHPs	Geothermal WSHP
Riverside High School	Belle, WV	187,766	Dual Duct Air Handling Systems	Geothermal WSHP and DOAS with VAV Terminal Units
St. Albans High School	St. Albans, WV	169,411	4-Pipe AHUs Boiler/Chiller	4-Pipe VAV AHU with new Boiler/Chiller
Lakewood Elementary School	Charleston, WV	25,377	Multizone & Single Zone Gas/DX RTUs	Single Zone Gas/DX RTUs and new Windows
Hamilton Middle School	Parkersburg, WV	78,783	Window AC units and Hot Water Unit Ventilators	DX/HW Ceiling Cassettes with DOAS and New Windows
Mineral Wells Elementary School	Parkersburg, WV	70,088	VAV AHUs Boiler/Chiller	New VAVs, Boiler, Chiller
Union Educational Complex	Grant County, WV	61,242	Baseboard HW and Window AC Units	Geothermal WSHP with DOAS
W.R. Castle Elementary	Wittensville, KY	50,269	HW Unit Vents and DX AHUs	Boiler/Tower WSHP
May Valley Elementary School	Martin, KY	48,065	Boiler/Chiller - 2 pipe Unit Ventilators with electric re-heat	Boiler/Tower WSHP with DOAS
Aldie Elementary School	Aldie, VA	16,299	Window AC units and Perimeter HW Heaters	Geothermal WSHP
Banneker Elementary School	Middleburg, VA	21,572	Window AC units and Perimeter HW Heaters	Geothermal WSHP
Broad Run High School	Ashburn, VA	94,357	CHW FCUs and RTUs	New FCUs, DOAS, RTUs
Catoctin Elementary School	Leesburg, VA	42,640	RTUs and Split Systems	New RTUs
Loudoun Valley High School	Purcellville, VA	73,792	CHW FCUs and RTUs	New FCUs, DOAS, RTUs
Middleburg Community Charter Academy	Middleburg, VA	14,060	RTUs, Window AC units and Perimeter HW Heaters	New Split Systems and RTUs
West Liberty University Main Hall	West Liberty, WV	101,558	4-Pipe AHUs, FCUs, Boiler/Chiller	New AHUs/FCUs, DOAS, Boiler/Chiller
<b>Total</b>		<b>1,141,279</b>		





# Summer Renovations – 100% On-time, 100% On-budget

COMPLETE HVAC SYSTEM REPLACEMENTS - SUMMER BREAK 2020				
Building	Location	SF	Demolished System	New System
Taylor County Middle School	Campbellsville, KY	83,900	2 Pipe Unit Ventilators	Boiler/Tower WSHP
Estes Elementary	Owensboro, KY	60,371	Gas/DX RTUs + VRV	VRV + DOAS
Foust Elementary	Owensboro, KY	57,150	Boiler/Chiller - 4 pipe Unit Ventilators	New Boiler/Chiller + New DOAS + Upgraded 4 pipe fan coils
Hager Preschool	Owensboro, KY	19,394	Constant Volume Gas/DX AHU Units	New VAV VRV AHU Units with Gas heat
Maintenance Building	Owensboro, KY	8,590	Furnace/DX split units	New Furnace/DX split units
Owensboro High School	Owensboro, KY	35,000	4 pipe Unit Ventilators	New Boiler plants + New VRV with DOAS
Owensboro North Middle School	Owensboro, KY	89,110	Boiler/Chiller - 4 pipe Unit Ventilators	New Boiler/Chiller + New DOAS + Upgraded 4 pipe fan coils + VRV
Sutton Elementary	Owensboro, KY	27,500	Constant Volume Gas/DX AHU Units	VRV + DOAS
Breckinridge County High School	Harned, KY	137,213	Boiler/Chiller - 2 Pipe VAV AHUs	Geothermal VAV WSHP w/ HW Reheat
Custer Elementary School				
Jackson Middle School				
Blennerhassett Elementary and Middle School				
Jefferson Elementary School				Geothermal Conversion
KCTCS Big Sandy - Pike County				
KCTCS Big Sandy - Wayne County				
Hardeeville Elementary and Middle School				DOAS
Ridgeland Elementary and Middle School				DOAS

86 Schools Renovated in 5 Summers

Zero days of delayed school

Building	Location	SF	Demolished System	New System
Bardstown Middle School	Bardstown, KY	47,700	Boiler/Tower WSHP	Boiler/Tower WSHP + ERVs
Elm Grove Elementary School	Wheeling, WV	37,500	Boiler/Chiller Dual Deck VAV	Geothermal WSHP + DOAS
Frankfort High School	Ridgeley, WV	89,848	Boiler/Tower WSHP	Geothermal WSHP
King Middle School	Harrodsburg, KY	88,327	2 Pipe Unit Ventilator	VRV + DOAS
Lost River Elementary School	Bowling Green, KY	67,694	WSHP	WSHP + DOAS
Martinsburg High School	Martinsburg, WV	63,620	Boiler/Chiller FCUs	Hybrid Geothermal + FCUs
Mercer Intermediate School	Harrodsburg, KY	78,200	Boiler/Tower WSHP	Boiler/Tower WSHP + ERVs
Middle Creek Elementary School	Wheeling, WV	37,500	Boiler/Chiller Dual Deck VAV	Geothermal WSHP + DOAS
Taylor County Middle School	Campbellsville, KY	24,865	2 Pipe AHU	Gas-Fired Package RTUs
Warren East High School	Bowling Green, KY	159,898	2 Pipe AHU & HW VAV Boxes	Geothermal WSHP
West Liberty University	West Liberty, WV	35,397	Boiler/Chiller AHU	Boiler/Chiller AHU
Wheeling Park High School	Wheeling, WV	348,849	Boiler/Chiller VAV + Elec Reheat	Boiler/Chiller VAV + HW Reheat
<b>Total</b>		<b>1,079,398</b>		





# Results

Building Name	Building Owner	Engineer	ESPC	Energy Star Score
Jody Richards Elementary School	Warren County Public Schools	CMTA	CMTA	100
Foster Heights Elementary	Nelson County Schools	CMTA	CMTA	100
Morgan County Middle School	Morgan County Schools	CMTA	CMTA	100
Morgan Central Elementary School	Morgan County Schools	CMTA	CMTA	100
South Warren High School	Warren County Public Schools	CMTA	CMTA	100
Natcher Elementary School	Warren County Public Schools	CMTA	CMTA	100
Warren East Middle School	Warren County Public Schools	CMTA	CMTA	100
Milton Elementary	Trimble County Schools	CMTA		100
Bristow Elementary School	Warren County Public Schools	CMTA	CMTA	100
Turkey Foot Middle School	Kenton County School District	CMTA		100
Richardville Elementary School	Warren County Public Schools	CMTA	CMTA	100
Marion County Knight Academy	Marion County Board of Education	CMTA	CMTA	100
Cox's Creek Elementary School	Nelson County Schools	CMTA	CMTA	100
East Valley Elementary School	Morgan County Schools	CMTA	CMTA	100
Bardstown Primary School	Bardstown City Schools	CMTA	CMTA	100
Owensboro South Middle School	Owensboro Public Schools	CMTA	CMTA	100
Hardinsburg Elementary School	Breckinridge County Schools	CMTA	CMTA	100
Oldham County Middle School	Oldham County Schools	CMTA		100
South Oldham Middle School	Oldham County Schools	CMTA		100
Bloomfield Middle School	Nelson County Schools	CMTA	CMTA	100
McCreary Middle School	McCreary County Schools	CMTA	CMTA	100
Norton Commons Elementary	Jefferson County Public Schools	CMTA		100
Frederick Douglas High School	Fayette County Public Schools	CMTA		100
Jennings Creek Elementary	Warren County Public Schools	CMTA	CMTA	100
Stamping Ground Elementary	Scott County Schools			100
Plano Elementary	Warren County Public Schools	CMTA		99
Cecilia Valley	Hardin County Schools			99
Eastern Elementary	Henry County Public Schools	CMTA	CMTA	99
North Middletown Elementary	Bourbon County Schools			99
Bloomfield Elementary	Nelson County Schools	CMTA	CMTA	99
Greenwood High School	Warren County Public Schools	CMTA	CMTA	99
Lemons Mill Elementary	Scott County Schools			99
Beechgrove Elementary	Kenton County School District	CMTA	CMTA	99
Old Kentucky Home Middle School	Nelson County Schools	CMTA	CMTA	99
Garth Elementary	Scott County Schools			99
Cumberland Trace Elementary	Warren County Public Schools	CMTA	CMTA	99
Kelly Elementary	Boone County School District			99
Southern Elementary	Scott County Schools			99
Twenhofel Middle School	Kenton County School District	CMTA		99
Eastside Middle School	Bullitt County Public Schools	CMTA		99
Henry F. Moss Middle School	Warren County Public Schools	CMTA	CMTA	99
Irvington Elementary School	Breckinridge County Schools	CMTA	CMTA	99
Breckinridge Middle School	Breckinridge County Schools	CMTA	CMTA	99

## Top Performing ENERGY STAR K-12 Schools in KY

CMTA ESPC Projects

CMTA Design Projects





# Results

Building Name	Building Owner	Engineer	ESPC	Energy Star Score
Jody Richards Elementary School	Warren County Public Schools	CMTA	CMTA	100
Foster Heights Elementary	Nelson County Schools	CMTA	CMTA	100
Morgan County Middle School	Morgan County Schools	CMTA	CMTA	100
Morgan Central Elementary School	Morgan County Schools	CMTA	CMTA	100
South Warren High School	Warren County Public Schools	CMTA	CMTA	100
Natcher Elementary School	Warren County Public Schools	CMTA	CMTA	100
Warren East Middle School	Warren County Public Schools	CMTA	CMTA	100
Milton Elementary	Trimble County Schools	CMTA		100
Bristow Elementary School	Warren County Public Schools	CMTA	CMTA	100
Turkey Foot Middle School	Kenton County School District	CMTA		100
Richardville Elementary School	Warren County Public Schools	CMTA	CMTA	100
Marion County Knight Academy	Marion County Board of Education	CMTA	CMTA	100
Gayle Creek Elementary School	Nelson County Schools	CMTA	CMTA	100

*Top Performing  
ENERGY STAR K-12  
Schools in KY*

***24/25 Perfect Energy  
Star Scores in KY!***

-  CMTA ESPC Projects
-  CMTA Design Projects



North Middletown Elementary	Bourbon County Schools			99
Bloomfield Elementary	Nelson County Schools	CMTA	CMTA	99
Greenwood High School	Warren County Public Schools	CMTA	CMTA	99
Lemons Mill Elementary	Scott County Schools			99
Beechgrove Elementary	Kenton County School District	CMTA	CMTA	99
Old Kentucky Home Middle School	Nelson County Schools	CMTA	CMTA	99
Garth Elementary	Scott County Schools			99
Cumberland Trace Elementary	Warren County Public Schools	CMTA	CMTA	99
Kelly Elementary	Boone County School District			99
Southern Elementary	Scott County Schools			99
Twenhofel Middle School	Kenton County School District	CMTA		99
Eastside Middle School	Bullitt County Public Schools	CMTA		99
Henry F. Moss Middle School	Warren County Public Schools	CMTA	CMTA	99
Irvington Elementary School	Breckinridge County Schools	CMTA	CMTA	99
Breckinridge Middle School	Breckinridge County Schools	CMTA	CMTA	99





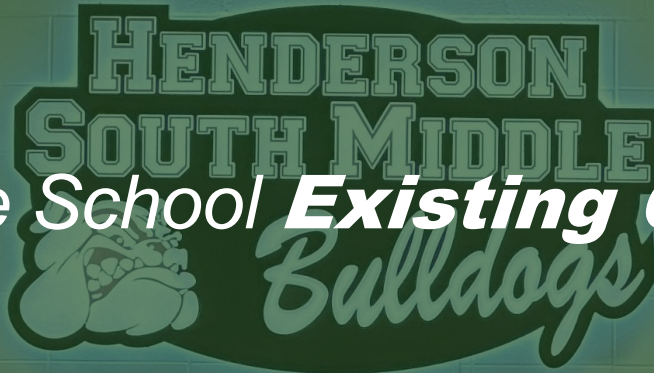
# EXCELLENCE IN ALL WE DO

## Kentucky Summative Assessment Rankings

OVERALL
HENDERSON SOUTH
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
FT BURNS
SOUTH HOPKINS MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
COLLEGE VIEW MIDDLE
WEBSTER CO. MIDDLE
BROWNING SPRINGS
HENDERSON SOUTH
UNION CO. MIDDLE

READING
DAVRESS CO. MIDDLE
HENDERSON SOUTH
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
FT BURNS
SOUTH HOPKINS MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
UNION CO. MIDDLE

MATH
HENDERSON SOUTH
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
COLLEGE VIEW MIDDLE
SOUTH HOPKINS MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
UNION CO. MIDDLE
BROWNING SPRINGS



SOC. STUDIES
HENDERSON SOUTH
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
FT BURNS
DAVRESS CO. MIDDLE
SOUTH HOPKINS MIDDLE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
WEBSTER CO. MIDDLE
BROWNING SPRINGS
UNION CO. MIDDLE

SCIENCE
DAVRESS CO. MIDDLE
DAVRESS CO. MIDDLE
WEBSTER CO. MIDDLE
HENDERSON SOUTH
DAVRESS CO. MIDDLE
FT BURNS
SOUTH HOPKINS MIDDLE
BROWNING SPRINGS
DAVRESS CO. MIDDLE
UNION CO. MIDDLE

WRITING
HENDERSON SOUTH
DAVRESS CO. MIDDLE
FT BURNS
BROWNING SPRINGS
COLLEGE VIEW MIDDLE
SOUTH HOPKINS MIDDLE
DAVRESS CO. MIDDLE
WEBSTER CO. MIDDLE
DAVRESS CO. MIDDLE
UNION CO. MIDDLE
DAVRESS CO. MIDDLE

South Middle School *Existing Conditions*

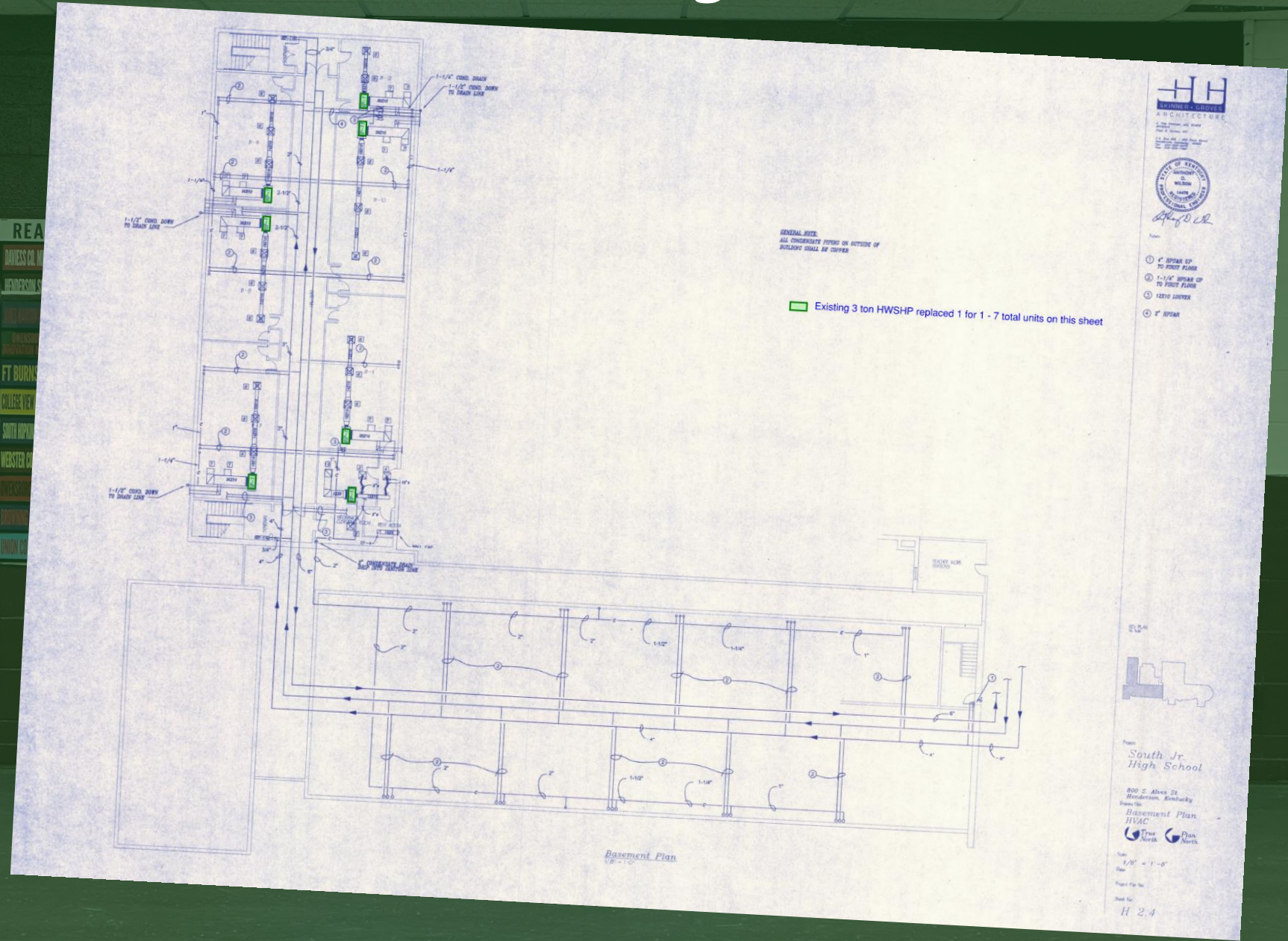


# South Middle School *Existing Conditions*



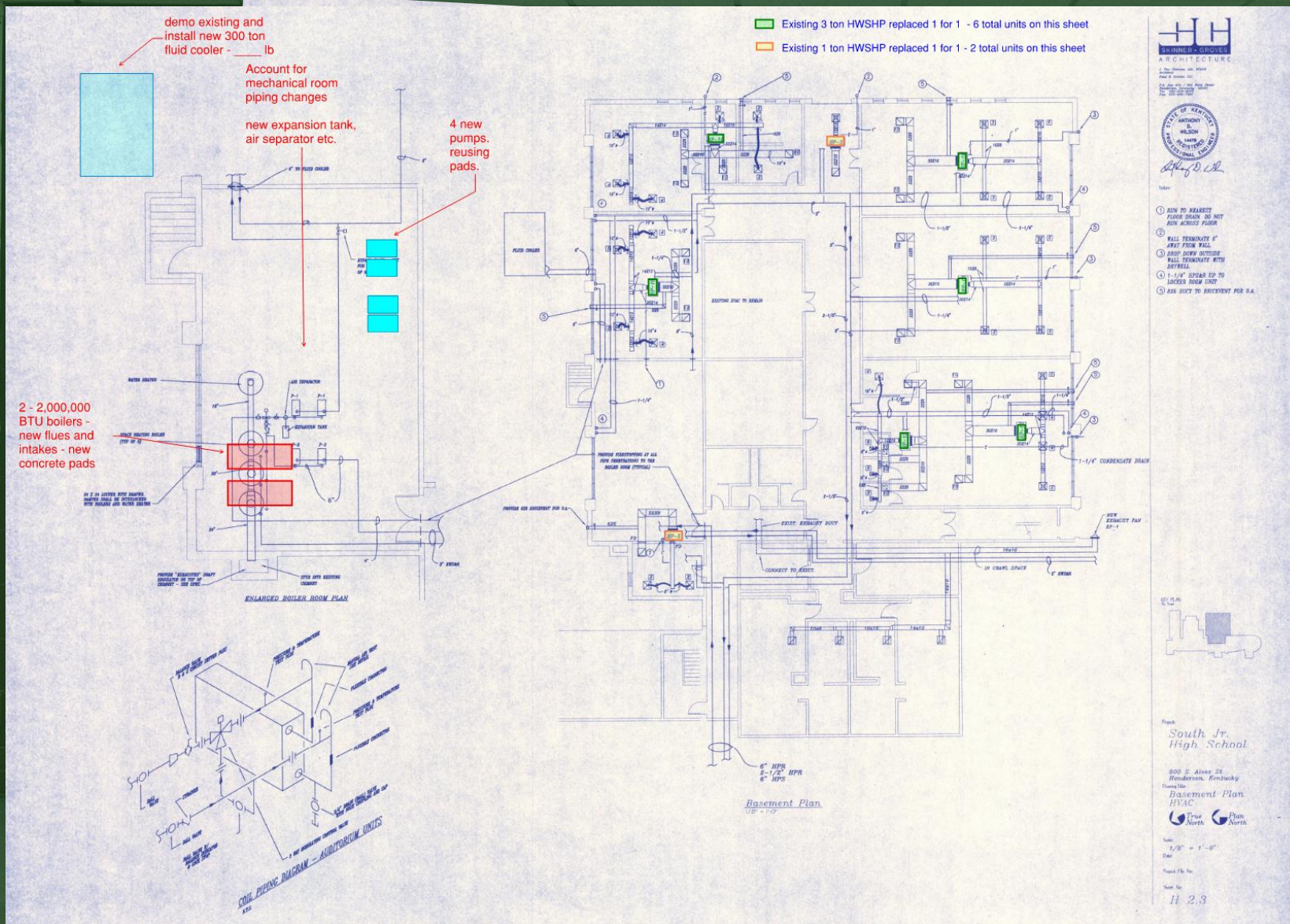


# South Middle School *Existing Conditions*



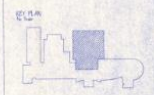


# South Middle School *Existing Conditions*



Anthony Wilson  
Professional Engineer

- 1 RUN TO NEAREST FLOOR DRAIN DO NOT RUN ABOVE FLOOR
- 2 WALL TERMINATE 4" AWAY FROM WALL
- 3 DUCT DOWN OUTSIDE WALL TERMINATE WITH DRYWELL
- 4 1-1/4" SPREAD UP TO JACKER ROOM UNIT
- 5 RUN DUCT TO BRICKWELL FOR R.A.



South Jr. High School

800 S. Albee St.  
Henderson, Kentucky  
Basement Plan  
HVAC

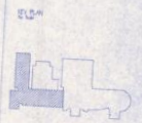


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Project File No.  
Sheet No.  
H 2.3



Anthony Wilson  
Professional Engineer

- 1 4" SPREAD UP TO FLOOR FLANGE
- 2 1-1/4" SPREAD UP TO FLOOR FLANGE
- 3 FLEXIBLE JOINT
- 4 2" SPREAD



South Jr. High School

800 S. Albee St.  
Henderson, Kentucky  
Basement Plan  
HVAC



Scale: 1/8" = 1'-0"  
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Project File No.  
Sheet No.  
H 2.4

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# South Middle School *Existing Conditions*

demo existing and install new 300 ton fluid

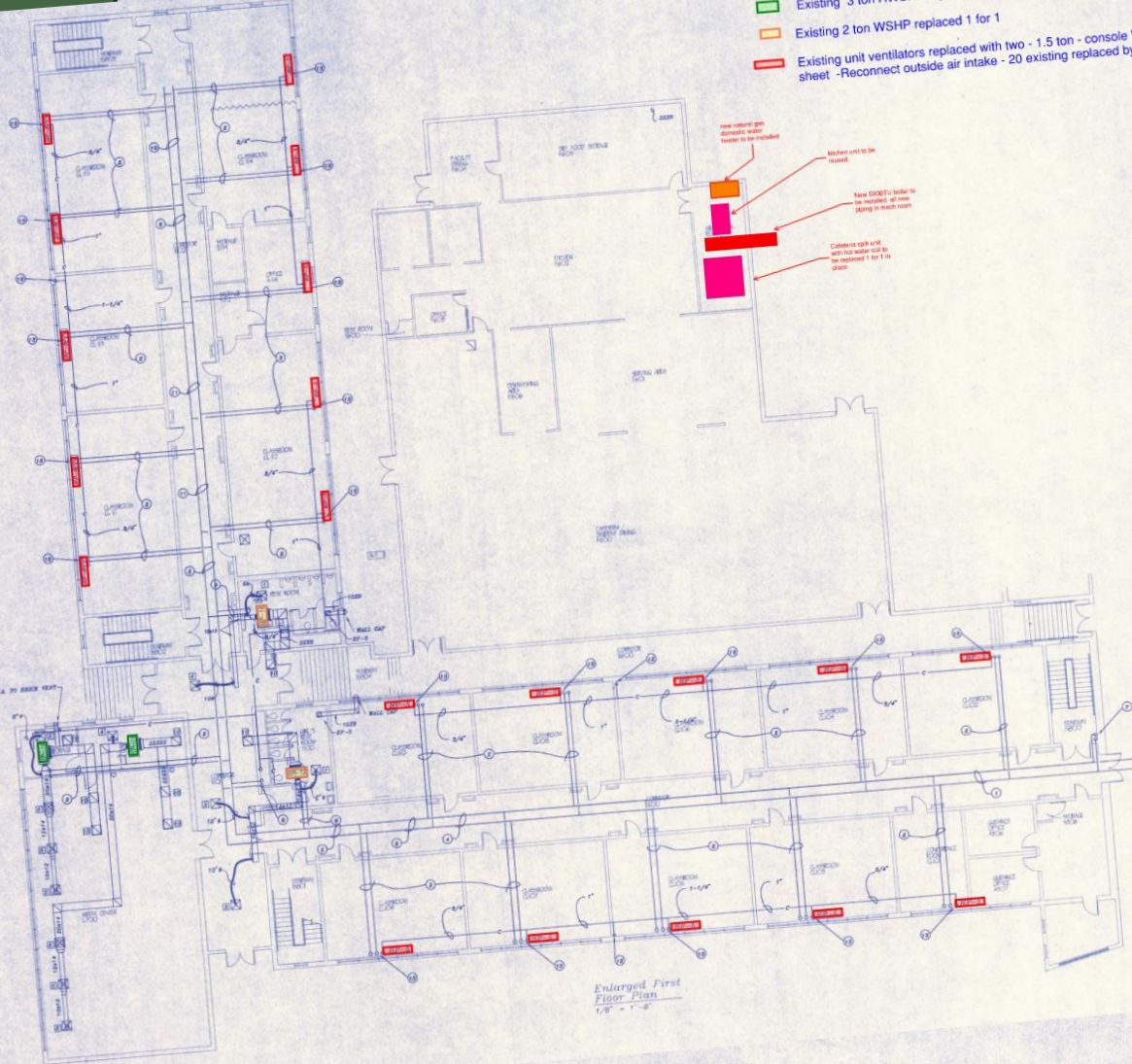
- Existing 3 ton HWSHP replaced 1 for 1 - 2 total units on this sheet
- Existing 2 ton WSHWP replaced 1 for 1
- Existing unit ventilators replaced with two - 1.5 ton - console WSHWP 20 total on this sheet -Reconnect outside air intake - 20 existing replaced by 40 total on this sheet

new cabinet gas electronic water heater to be installed

Water unit to be removed

New BOEET boiler to be installed at new piping in track room

Colletta air unit with hot water coil to be replaced 1 for 1 in track room



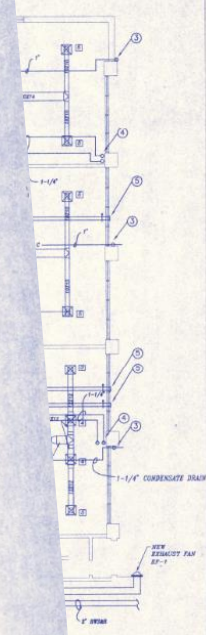
Enlarged First Floor Plan  
1/8" = 1'-0"



1. 4" RISE IN CEILING SPACE
2. 1-1/4" RISE IN CEILING TO SERVE SECOND FLOOR UNIT
3. 1-1/2" RISE IN CEILING TO SERVE SECOND FLOOR UNIT
4. 4" RISE
5. 2" RISE
6. 4" RISE DOWN TO LOWER LEVEL
7. 1-1/2" RISE UP TO SECOND FLOOR
8. 1" RISE
9. 1-1/2" RISE
10. 2-1/2" RISE
11. 1-1/2" CONDENSATE DOWN TO LOWER LEVEL
12. 2-1/2" CONDENSATE 1-1/2" RISE UP FROM FLOOR TO SECOND FLOOR

Project: South Jr. High School  
800 S. Albee Street, Henderson, Kentucky  
Drawing No: Floor Plan  
Scale: 1/8" = 1'-0"  
Date: H 2.2

al units on this sheet  
al units on this sheet



Project: South Jr. High School  
800 S. Albee St., Henderson, Kentucky  
Drawing No: Basement Plan  
Scale: 1/8" = 1'-0"  
Date: H 2.3



1. RUN TO NEAREST FLOOR DRAIN DO NOT RUN ABOVE FLOOR
2. WALL TERMINATE 6" AWAY FROM WALL
3. DROP DOWN OUTSIDE WALL TERMINATE WITH DRYWELL
4. 1-1/4" RISE UP TO JACKER ROOM UNIT
5. RUN DOWN TO BRICKVENT FOR R.A.

this sheet

Project: South Jr. High School  
800 S. Albee St., Henderson, Kentucky  
Drawing No: Basement Plan  
Scale: 1/8" = 1'-0"  
Date: H 2.4



1. 4" RISE UP TO FIRST FLOOR
2. 1-1/4" RISE UP TO FIRST FLOOR
3. 2" RISE



# South Middle School HVAC System Option 1

## Boiler/Tower

✓ New “Like-for-Like” HVAC System:

Boiler/Tower

Unit Ventilators

Gas/DX Auditorium

✓ Lowest First Cost, but highest humidity risk

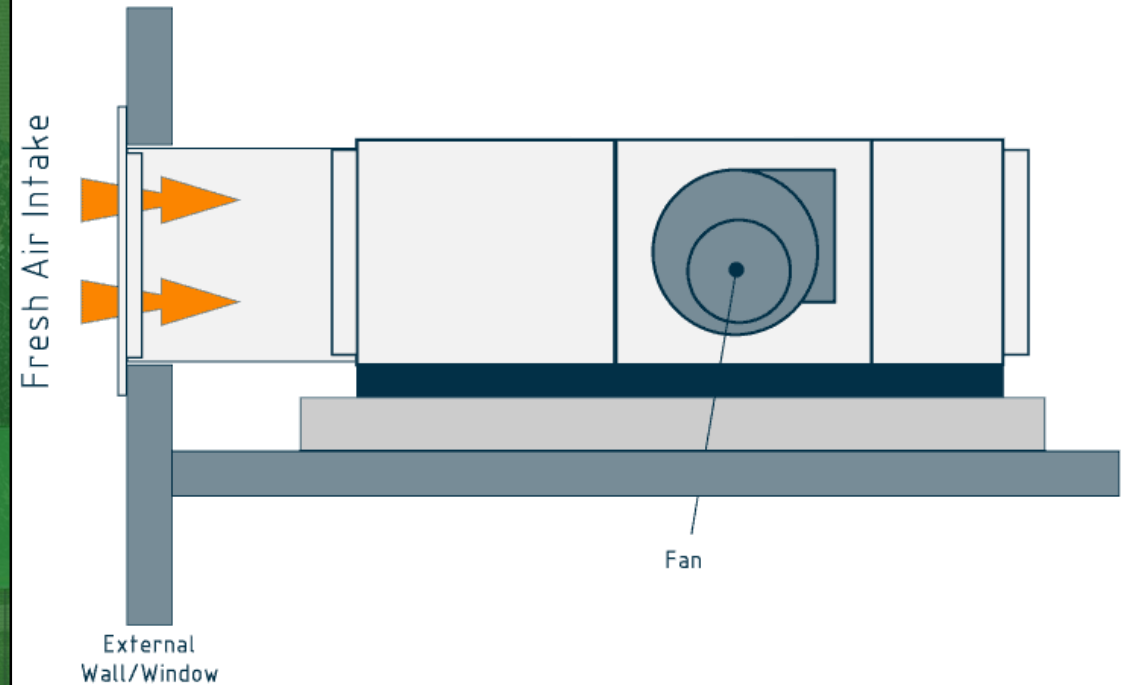
Building EUI

41 → 37

Annual Savings

\$4,000

Unit Ventilator – Humidity Control



South Middle School



# South Middle School HVAC System Option 1

## Boiler/Tower



\$4,000



# South Middle School HVAC System Option 2

## Boiler/Tower + DOAS

✓ New UPGRADED “Like-for-Like” HVAC System:

Boiler/Tower

Console Heat Pumps

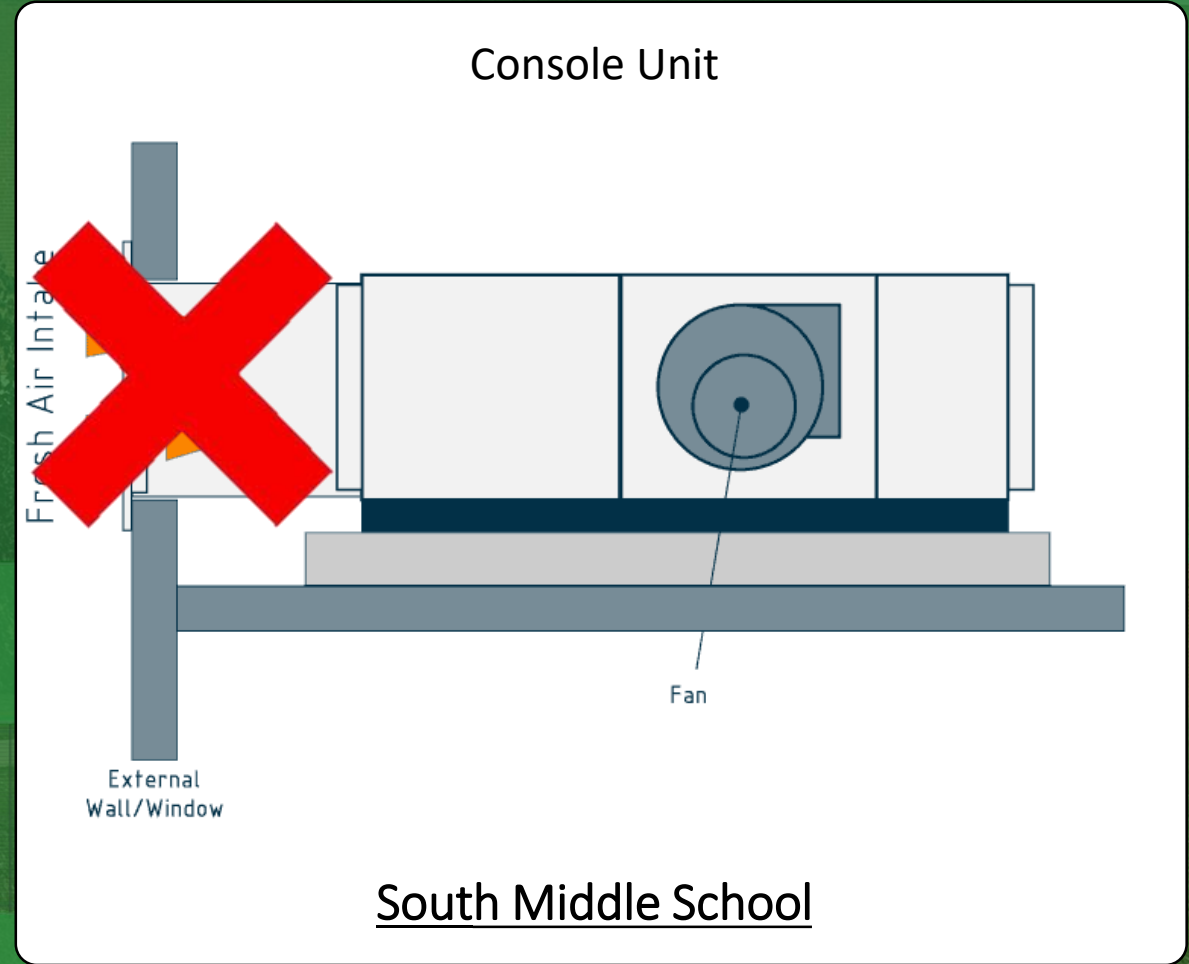
Gas/DX Auditorium

Building EUI

41 → 35

Annual Savings

\$8,000





# South Middle School HVAC System Option 2

## Boiler/Tower + DOAS

✓ New UPGRADED “Like-for-Like” HVAC System:

Boiler/Tower

Console Heat Pumps

Gas/DX Auditorium

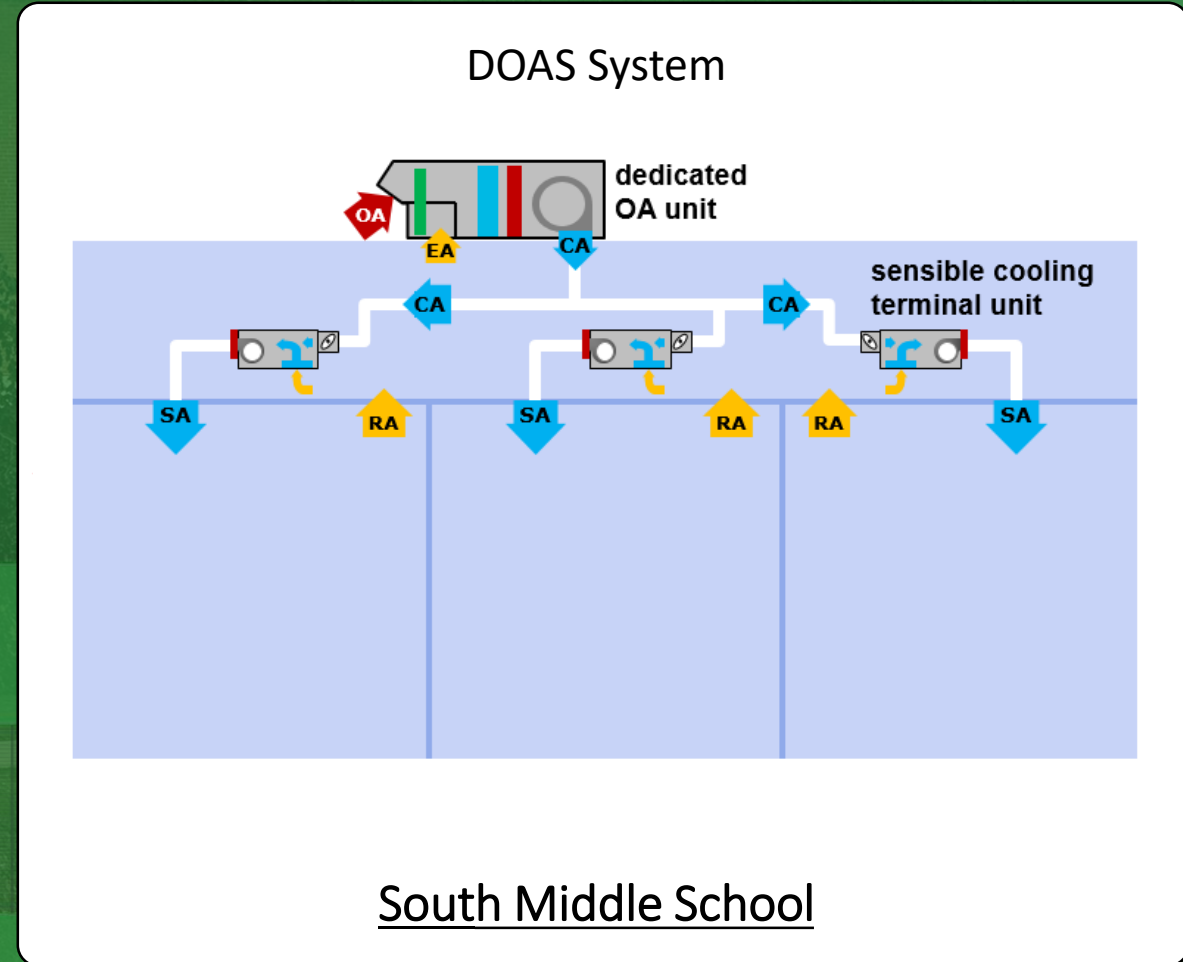
DOAS – Energy Recovery

Building EUI

**41** → **35**

Annual Savings

**\$8,000**





# South Middle School HVAC System Option 2

## Boiler/Tower + DOAS

✓ New UPGRADED “Like-for-Like” HVAC System:

Boiler/Tower

Console Heat Pumps

Gas/DX Auditorium

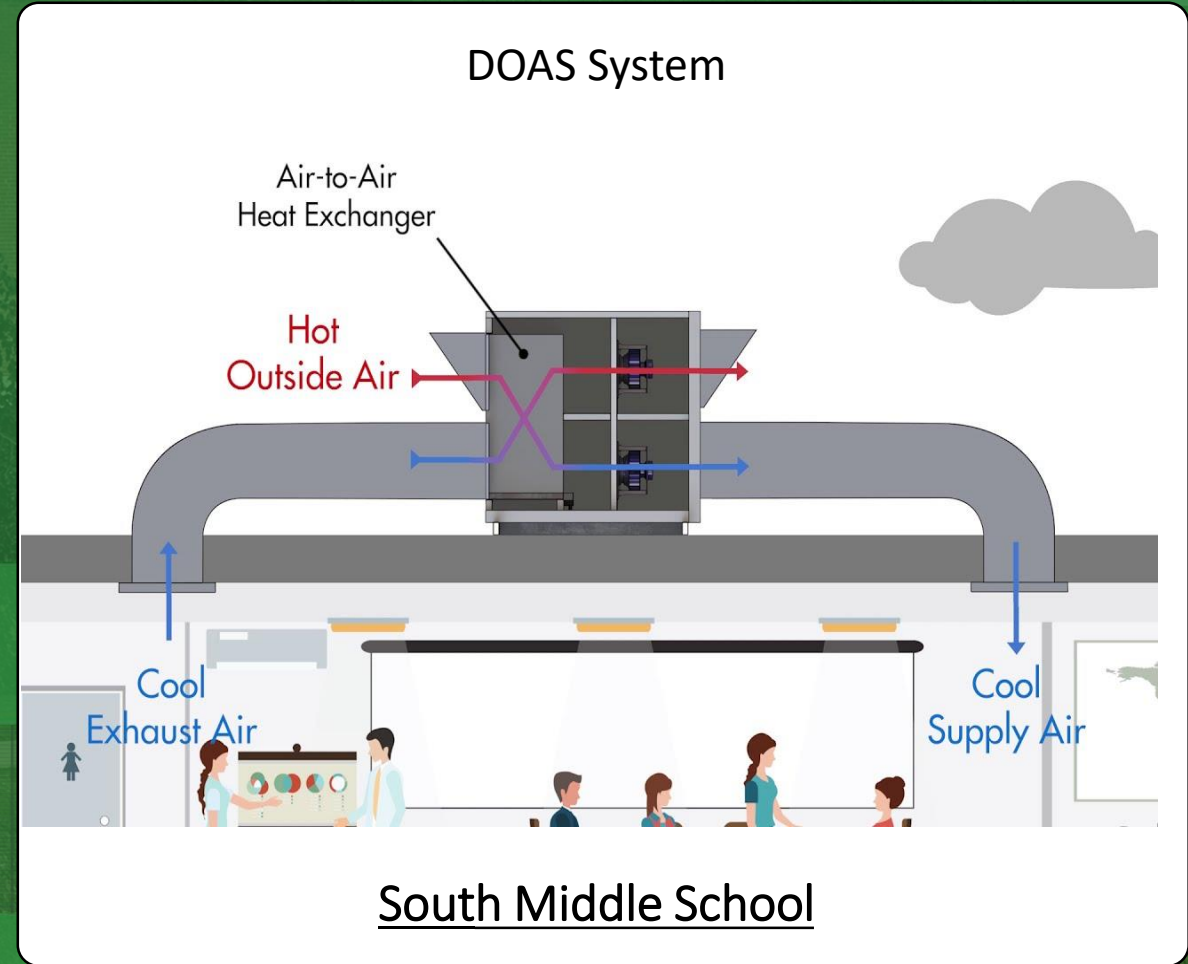
DOAS – Energy Recovery

Building EUI

**41** → **35**

Annual Savings

**\$8,000**





# South Middle School HVAC System Option 2

## Boiler/Tower + DOAS

✓ New **UPGRADED** “Like-for-Like” HVAC System:

**Boiler/Tower**

**Console Heat Pumps**

**Gas/DX Auditorium**

**DOAS – Energy Recovery**

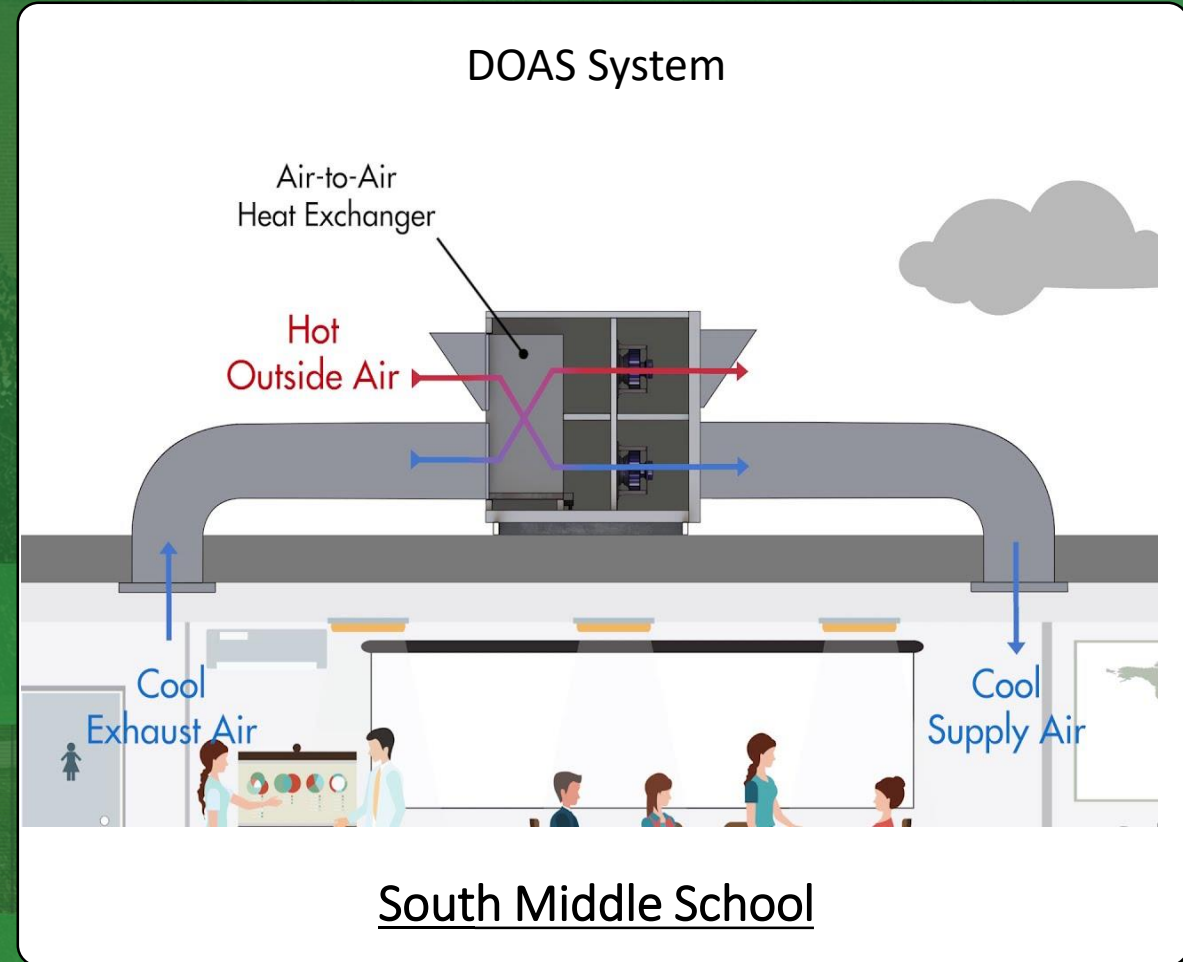
✓ **Higher First Cost but best humidity control**

Building EUI

**41** → **35**

Annual Savings

**\$8,000**





# South Middle School HVAC System Option 3

## Geothermal + DOAS

✓ New UPGRADED “Like-for-Like” HVAC System:

### Geothermal

Console Heat Pumps

Gas/DX Auditorium

DOAS – Energy Recovery

✓ Highest First Cost but best life cycle cost

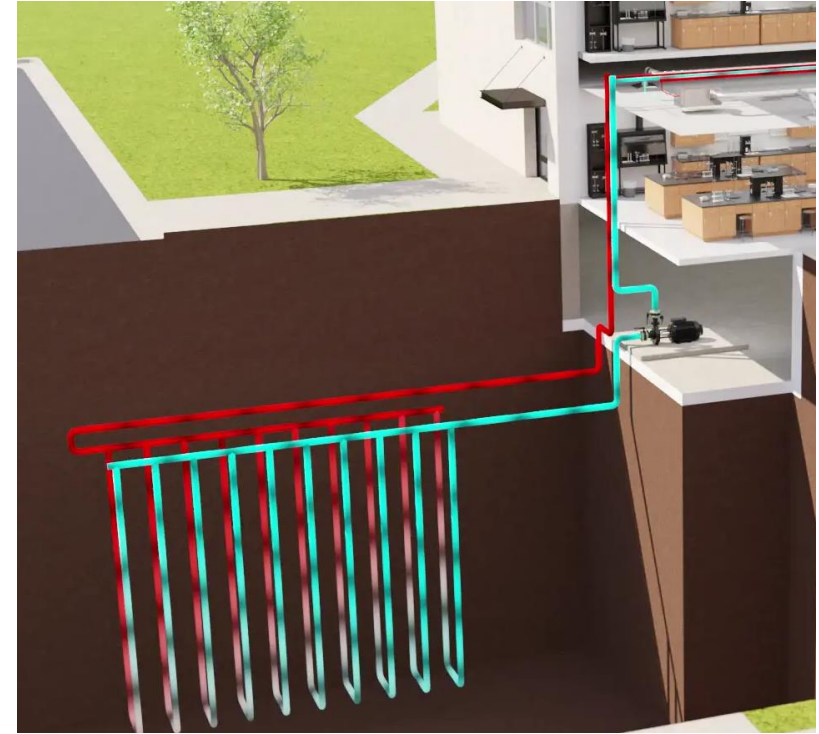
Building EUI

**41** → **27**

Annual Savings

**\$19,000**

Geothermal



South Middle School

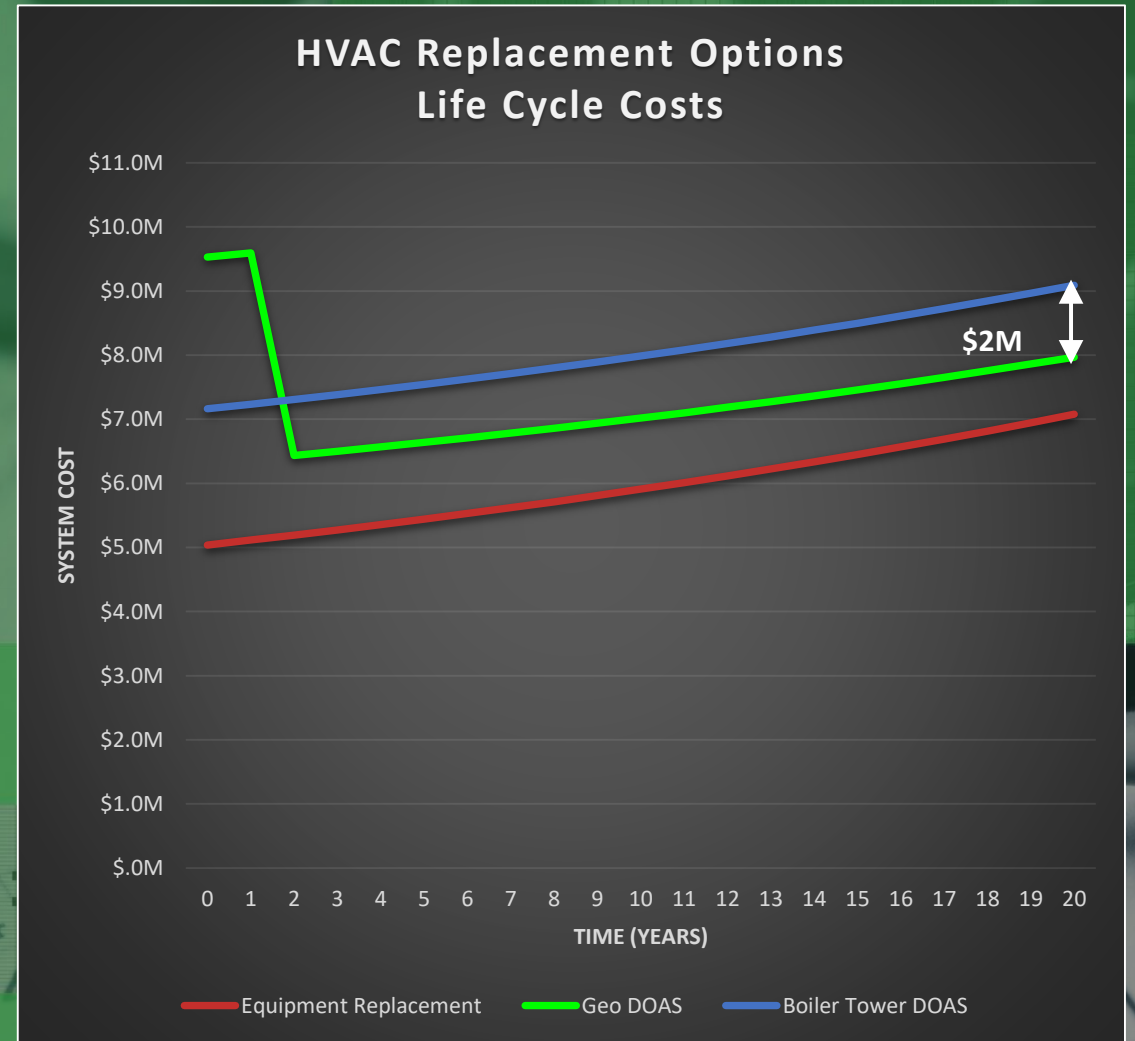


# Inflation Reduction Act Impact

## Investment Tax Credit (ITC) - New Policy

- ✓ Tax-Exempt Entities Direct Pay Option
- ✓ Increases to 25.5% Investment Tax Credit (ITC)
- ✓ Domestic Content: +8.5
  - 100% of steel and iron must be US manufactured
  - Goods must be 40% US manufactured through 2024, 55% by 2027

*Maximum Use of Funds & Project Impact!*

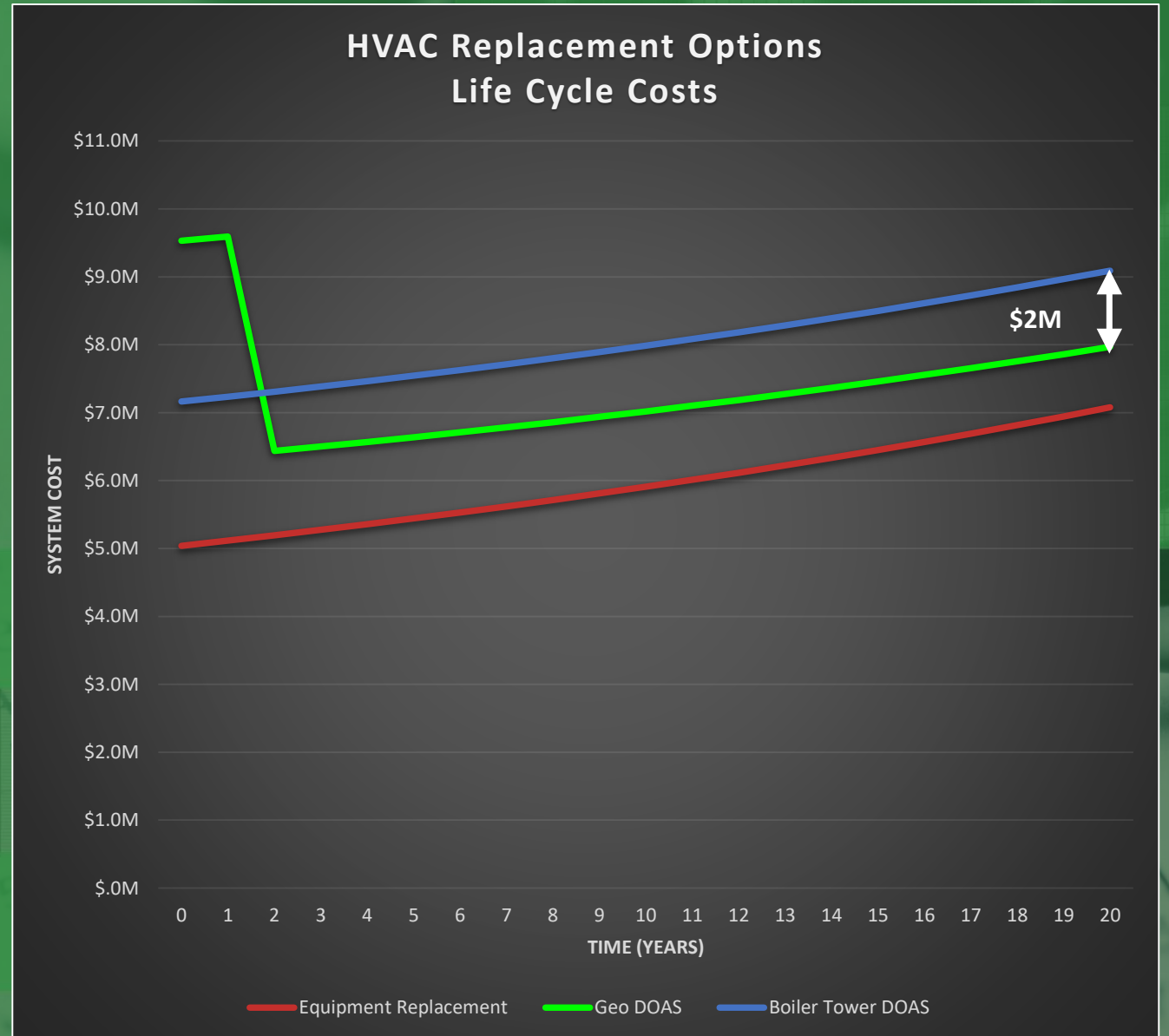


# HVAC Life Cycle Cost Comparison

## Cost/Savings Summary Chart

Retrofit Scenario	First Cost Budget	ITC Incentive	Net Capital Cost
<b>Option 1:</b> Like-for-Like	<b>\$5,039,581</b>	\$0	<b>\$5,039,581</b>
<b>Option 2:</b> Boiler Tower + DOAS	<b>\$7,163,902</b>	\$0	<b>\$7,163,902</b>
<b>Option 3:</b> Geothermal + DOAS	<b>\$9,532,066</b>	\$3,220,903	<b>\$6,311,164</b>

*Minimize Life Cycle Cost  
Maximize Occupant Comfort*



# Project Procurement Options

Retrofit Scenario	First Cost Budget	ITC Incentive	Net Capital Cost
<b>Option 1:</b> Like-for-Like	<b>\$5,039,581</b>	\$0	<b>\$5,039,581</b>
<b>Option 2:</b> Boiler Tower + DOAS	<b>\$7,163,902</b>	\$0	<b>\$7,163,902</b>
<b>Option 3:</b> Geothermal + DOAS	<b>\$9,532,066</b>	\$3,220,903	<b>\$6,311,164</b>



# CMTA Project References



## Taylor County Schools

Mr. Charles Higdon, Jr.  
Superintendent  
(270) 465-5371  
Contract amount: **\$3,643,995**



## Hart County Schools

Mr. Steve Caven  
Director of Personnel, Ops and Planning, (910) 545-7417  
Contract amount: **\$10,798,000**



## Owensboro Schools

Mr. Chris Bozarth  
Director of Facilities  
(270) 302-9790  
Contract amount: **\$13,048,520**



## Pontotoc City Schools

Phillip Webb  
Superintendent  
(662) 401-5632  
Contract amount: **\$1,803,695**

## Henry County Schools

Jamie Kemp  
Maintenance Supervisor  
(731) 363-4078  
Contract amount: **\$1,400,000**

## Warren County Schools

Mr. Chris McIntyre  
Chief Financial Officer  
270-781-5150  
Contract amount: **\$30,324,085**

## Daviess County Schools

Mr. Matt Robbins  
Superintendent  
(270) 316-1858  
Contract amount: **\$4,240,917**

## Nelson County

Mr. Wes Bradley  
Superintendent  
(502) 331-8600  
Contract amount: **\$6,743,839**

## Morgan County Schools

Mr. Darren Sparkman  
Facilities Director  
(606) 743-8002  
Contract amount **\$4,811,246**

## Jefferson County Schools

Ms. Susan Biasioli  
Director of Facility Development  
(502) 485-3315  
Contract amount: **\$4,993,276**

## Bardstown Independent

Dr. Ryan Clark  
Superintendent  
(502) 331-8800  
Contract amount: **\$8,620,530**

## Berkeley County Schools

Dr. Patrick Murphy  
Superintendent  
(304) 676-4801  
Contract amount **\$28,276,000**

## Kanawha County Schools

Mr. Dwayne C. Smith  
Facilities Director  
(304) 395-9352  
Contract amount **\$96,667,547**

## Johnson County Schools

Mr. Tim Adams  
Director of Facilities  
(606) 792-8331  
Contract amount: **\$5,346,750**

## Greeneville City Schools

Mr. Phillip Graham  
Operations Supervisor  
(423) 787-8017  
Contract amount: **\$3,162,593**

## Loudoun County Schools

Mr. Don Treanor  
Director of Facilities  
(571) 252-2960  
Contract amount: **\$5,162,593**

