PUYALLUP SCHOOL DISTRICT
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powerED Summary Report - 2024

The Puyallup School District's powerED Program is working to maximize efficiency and utility cost savings for energy and water through low and no-cost opportunities. This report will share utility use data as it becomes available.

PROGRAM BACKGROUND

Year one of the McKinstry/Puyallup powerED program focused on getting to know the District's priorities, establishing a working relationship, identifying low effort, high impact Energy Conservation Measures (ECMs), and working with the district to streamline implementation of ECMs. There was also significant effort put towards working with the developer of Reveal to set up, test and validate Analytics that are proving to be a useful tool to efficiently identify potential energy efficiency issues with HVAC equipment across the district. Use of this technology platform is already demonstrating an impact, and continuing to refine use of the analytics module will only increase their effective support of efficient PSD operations in the coming years.

PROGRAM HIGHLIGHTS

150+ SEPARATE ISSUES IDENTIFIED FOR INVESTIGATION

- In late October, McKinstry started identifying and assessing ECMs with implementations starting in early December. Issues were identified through controls reviews using Reveal Analytics, Deep Dives (targeted investigations), and site walks.
- Issues ranged from classroom level heat pumps with possible malfunctioning heating/cooling valves, to identifying large air handling equipment that was running continuously.
- Issues were documented and forwarded to district Facilities Team and JCI vendor for further investigation and resolution when warranted.

HVAC SCHEDULE AUDIT AND MODIFICATION

- McKinstry conducted an audit of all HVAC schedules at all schools across the district and proposed modifications to remove excessive equipment runtime while still allowing the systems to operate for the durations of occupancy by students and teachers.
- Zone temperature studies were conducted pre and post modifications to ensure that there were no significant comfort issues that would result from the modifications.
- Modifications resulted in excessive equipment runtime reductions
    - Elementary Schools (20): Average of **23%** of scheduled hours saved.
        - Classrooms saved an average of 3 hours of runtime per day
    - Middle Schools (7): Average of **19%** of hours scheduled hours saved
        - Classrooms saved an average of 2.5 hours of runtime per day
    - High Schools (3): Average of **8%** of scheduled hours saved
        - Classrooms, saved an average of 0.8 hours of runtime per day

SAVINGS SNAPSHOT

As Energy Conservation Measures are implemented, utility data will be collected and analyzed to determine Energy Savings.

TOTAL ENERGY SAVINGS

FROM IMPLEMENTATION PERIOD TO ENERGY CURRENT DATE (DEC '23 - AUG '24)

1,485,000 (kBtu)

WHICH IS ENOUGH ENERGY TO RUN **22** SINGLE FAMILY HOMES IN WASHINGTON STATE FOR 1 YEAR

*U.S. EIA 2020 RESIDENTIAL ENERGY CONSUMPTION SURVEY

TOTAL ESTIMATED COST AVOIDANCE

FROM IMPLEMENTATION PERIOD TO ENERGY CURRENT DATE (DEC '23 - AUG '24)

$95,000

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REVEAL DEVELOPMENT, TESTING AND MAINTENANCE

- McKinstry personnel have consistently been working with the developer of Reveal to implement and quality check Analytics tools and Key Performance Indicators. These tools are leveraged to efficiently identify equipment issues that indicate possible energy inefficiencies.
- Similar maintenance and QC occur with utility data, a vital effort to ensure the best possible utility data quality to accurately assess district consumption and performance.

PORTABLES IN UNOCCUPIED MODE DURING SUMMER BREAK

- Coordinated with PSD Facility Operations to prioritize custodial activities in portables across the district to allow them to be placed in unoccupied mode for the majority of summer break, reducing the need for mechanical cooling during the hot summer months.

OUTSIDE AIR DAMPER MODIFICATION TESTS

- With PSD Facilities Team and JCI control vendor, McKinstry proposed and tested programming modifications at ten schools to improve energy efficiency during summer operations.
- Tests proved viable and the effort is planned to be implemented across district facilities that have minimal use during the summer months.

SUMMER BREAK SETPOINT MODIFICATION TESTS

- Setpoints at select schools were adjusted during summer break to reduce the energy requirements for mechanical cooling improve efficiency.
- Tests indicated that there may need to be minor modifications but can similarly be implemented at district facilities with minimal use during summer months.

PARTICIPATION IN UTILITY PROVIDER CSEM PROGRAMS

- Coordinated with Puget Sound Energy and Tacoma Public Utilities to participate in their Commercial Strategic Energy Management incentive programs. This is an ongoing effort that will continue for the duration of the CSEM contracts.
- Latest data shows that the district is currently at 3.6% savings of a 2% goal set by TPU.

ENERGY MANAGEMENT PLAN

- McKinstry worked with PSD personnel to draft and finalize a district wide Energy Management Plan that sets the framework for best practices surrounding energy conservation efforts.

Energy Conservation Measures have occurred across the district, focusing on school campuses in Year 1 of the powerED contract. The primary focus for Year 1 was auditing school HVAC schedules and removing excessive runtime that was not required based on building use. This effort will continue in the coming year as fine-tuning and regular schedule audits occur. This effort resulted in the following:

ELEMENTARY SCHOOLS HAD AN AVERAGE OF 23% REDUCTION IN EQUIPMENT RUNTIME

MIDDLE SCHOOLS HAD AN AVERAGE OF 19% REDUCTION IN EQUIPMENT RUNTIME

HIGH SCHOOLS HAD AN AVERAGE OF 8% REDUCTION IN EQUIPMENT RUNTIME

SEPARATE POSSIBLE ENERGY SAVINGS OPPORTUNITIES IDENTIFIED

150+ AND COUNTING

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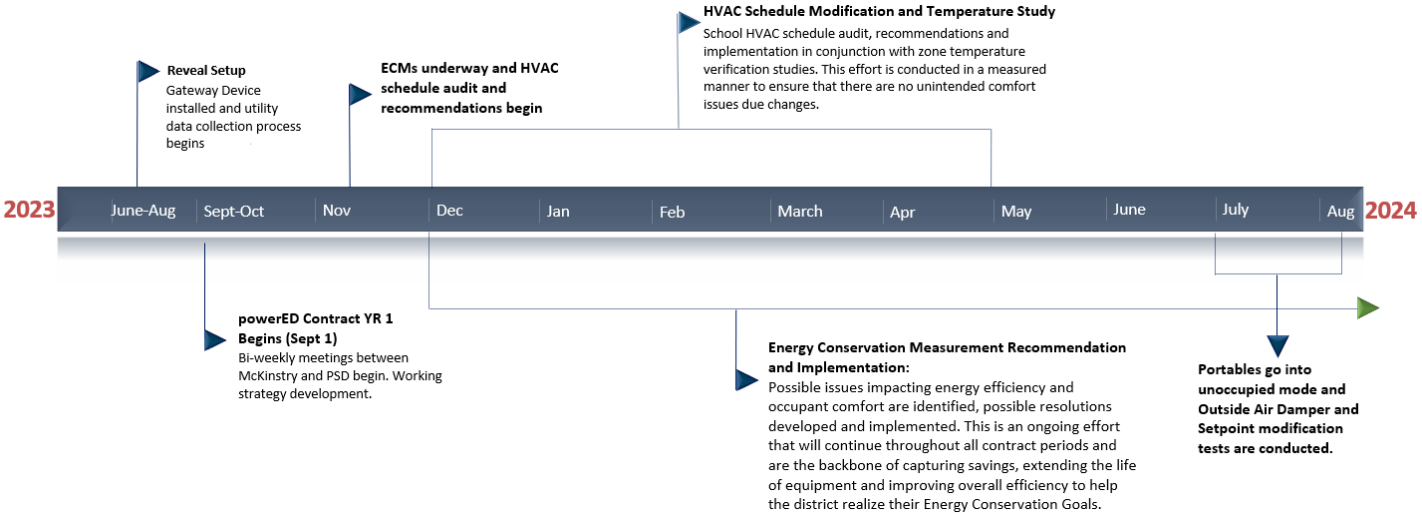
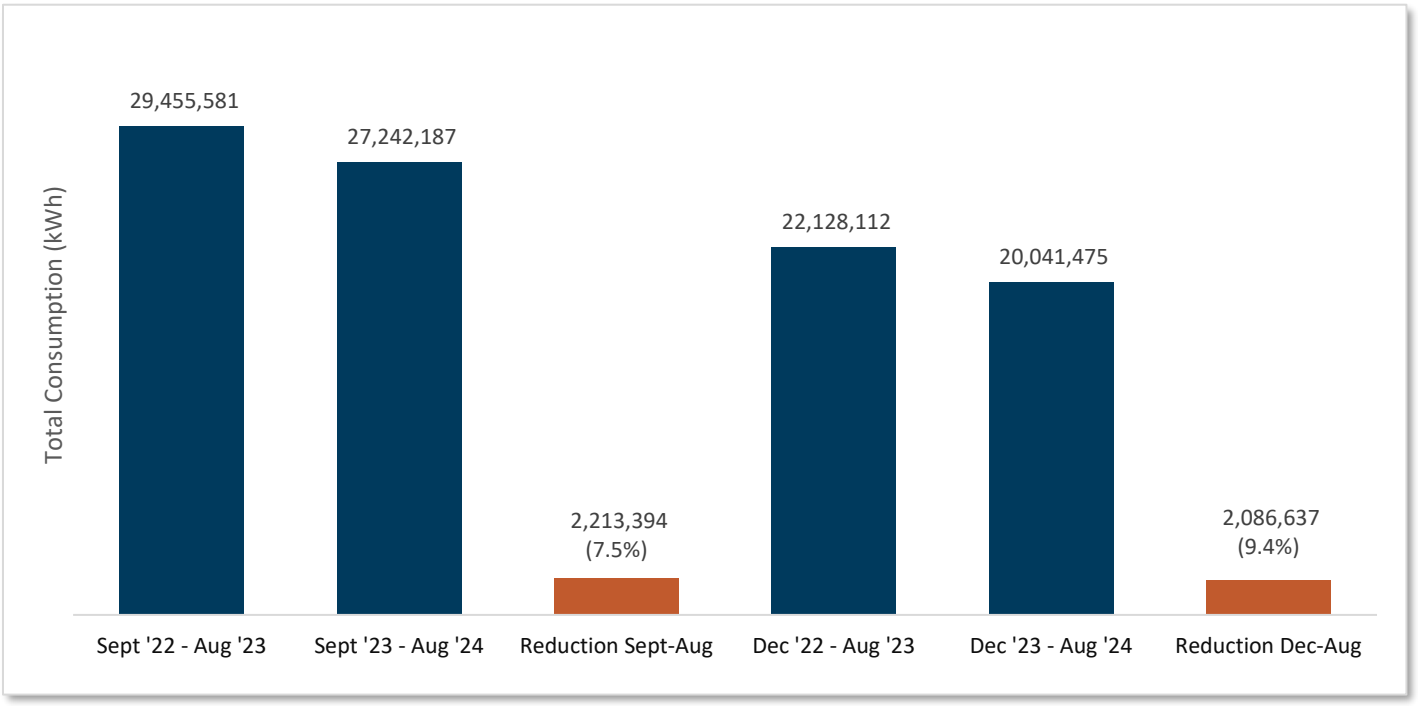
MCKINSTRY/PUYALLUP powerED TIMELINE



TOTAL ELECTRIC CONSUMPTION ACROSS ALL DISTRICT FACILITIES FOR NOTED TIMEFRAMES

- September through June data represents the utility data available for school year to date
- December through June data represents the Implementation Period when system changes were being made. Recommendations and Implementations continue to be made to present.



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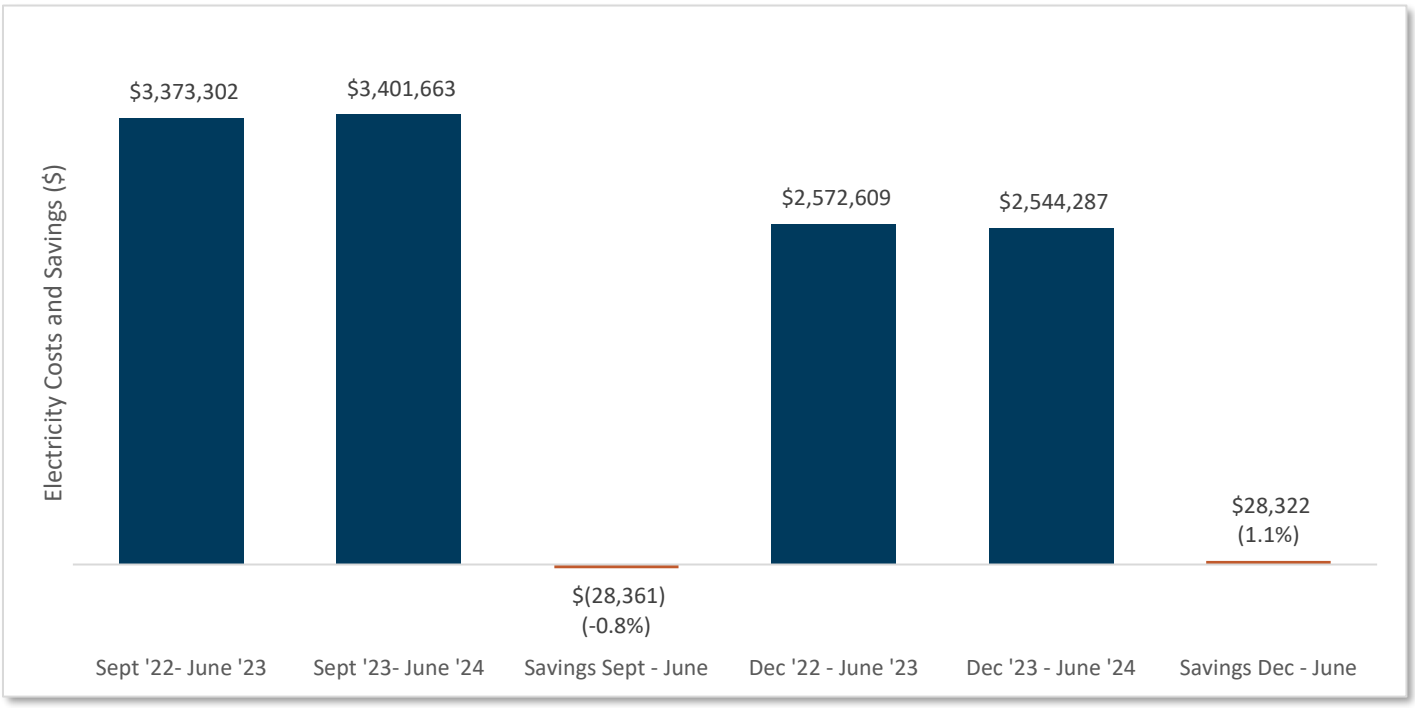
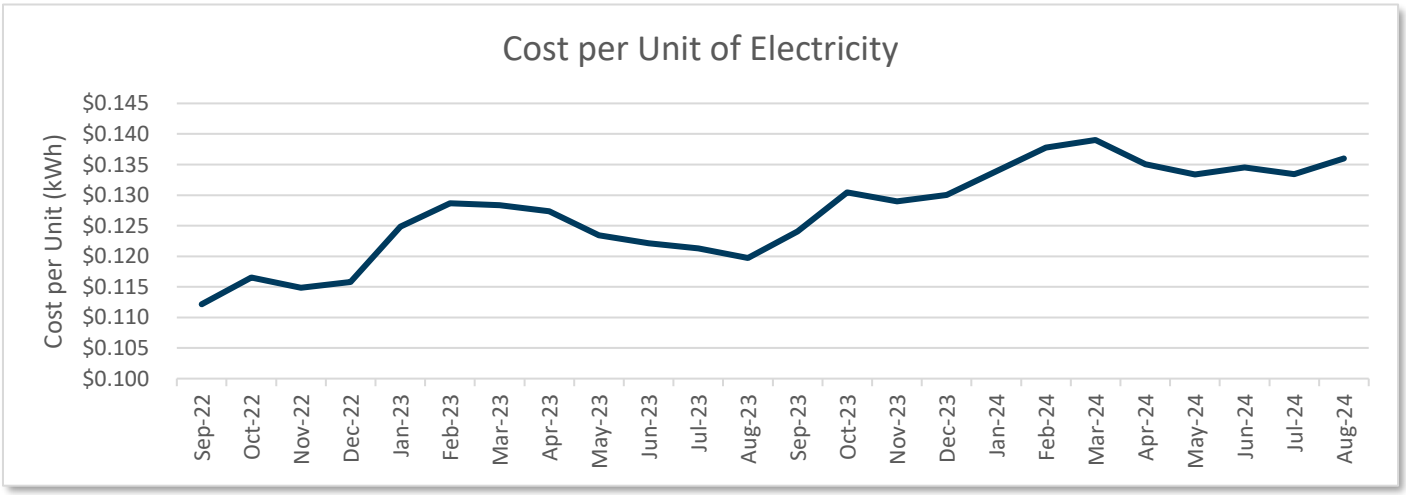
TOTAL COST OF ELECTRICITY ACROSS ALL DISTRICT FACILITIES FOR NOTED TIMEFRAMES



COST PER UNIT OF ELECTRICITY *PSE data from EnergyCAP

Consistent unit cost increase shows why despite actual kWh savings, the savings are not reflected in cost.



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TOTAL NATURAL GAS CONSUMPTION ACROSS ALL DISTRICT FACILITIES FOR NOTED TIMEFRAMES

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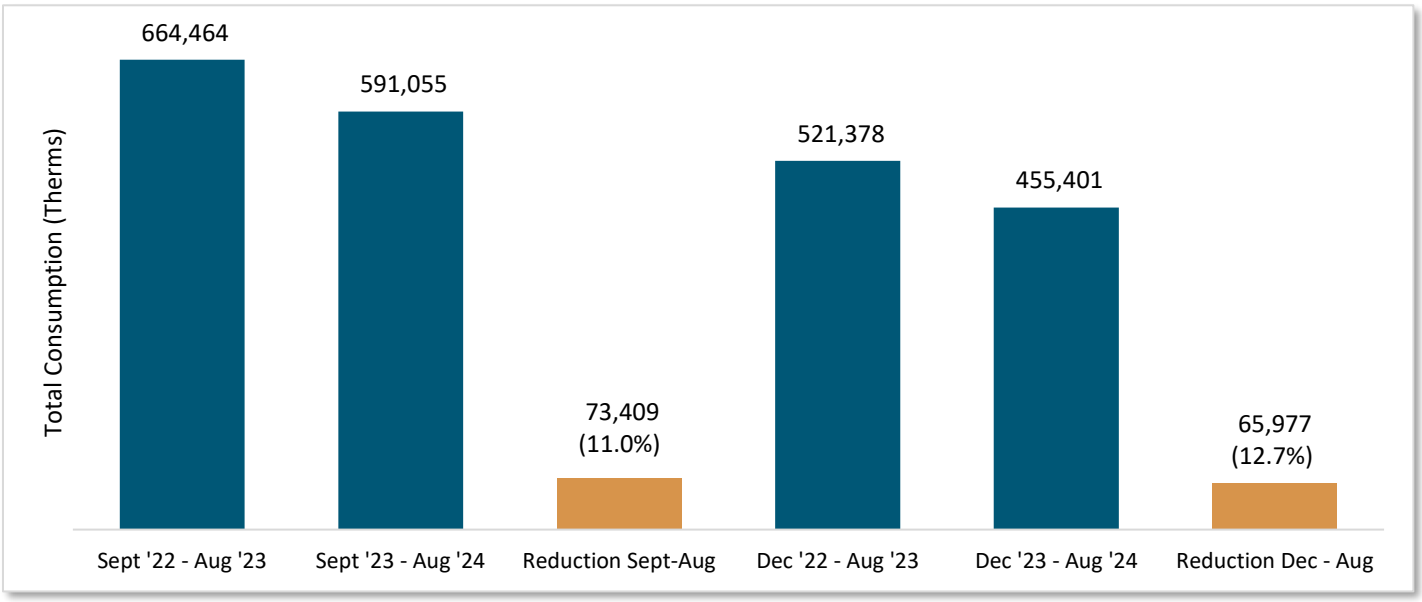
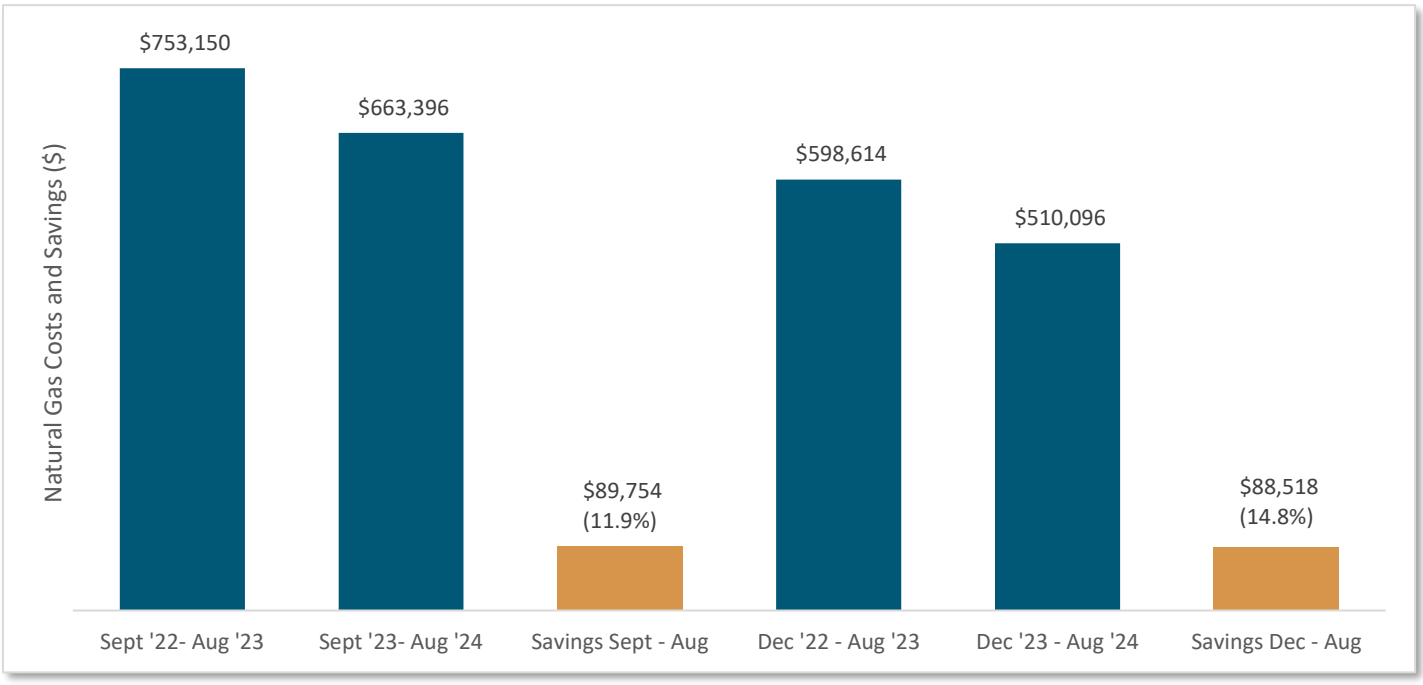
- December through June data represents the Implementation Period when system changes were being made. Recommendations and Implementations continue to be made to present.



TOTAL COST OF NATURAL GAS ACROSS ALL DISTRICT FACILITIES FOR NOTED TIMEFRAMES



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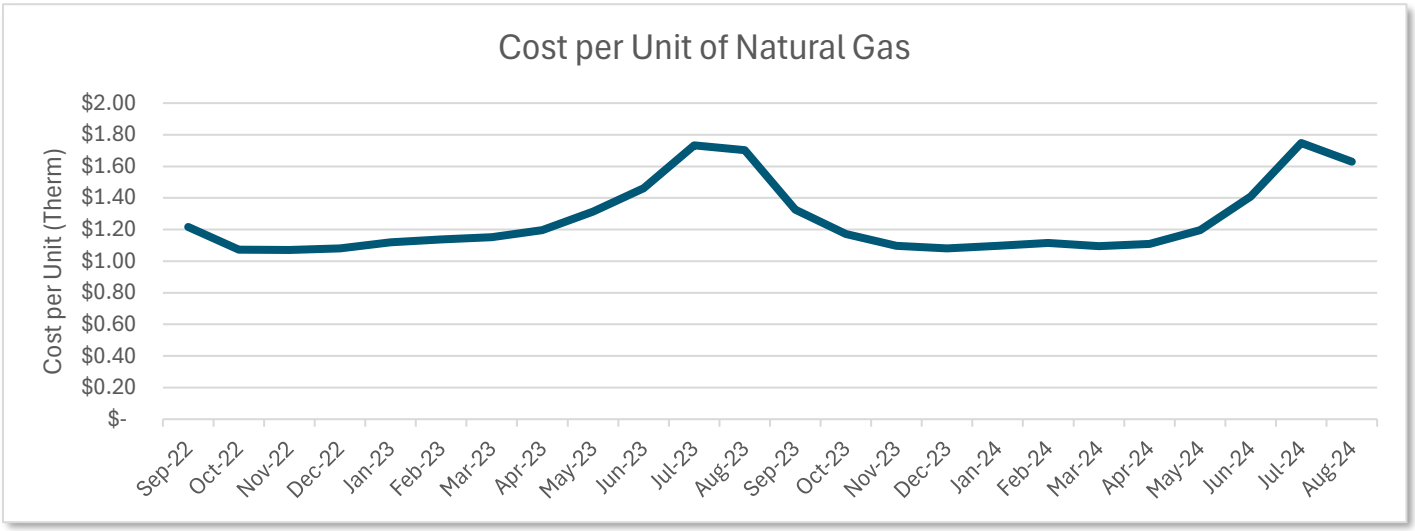
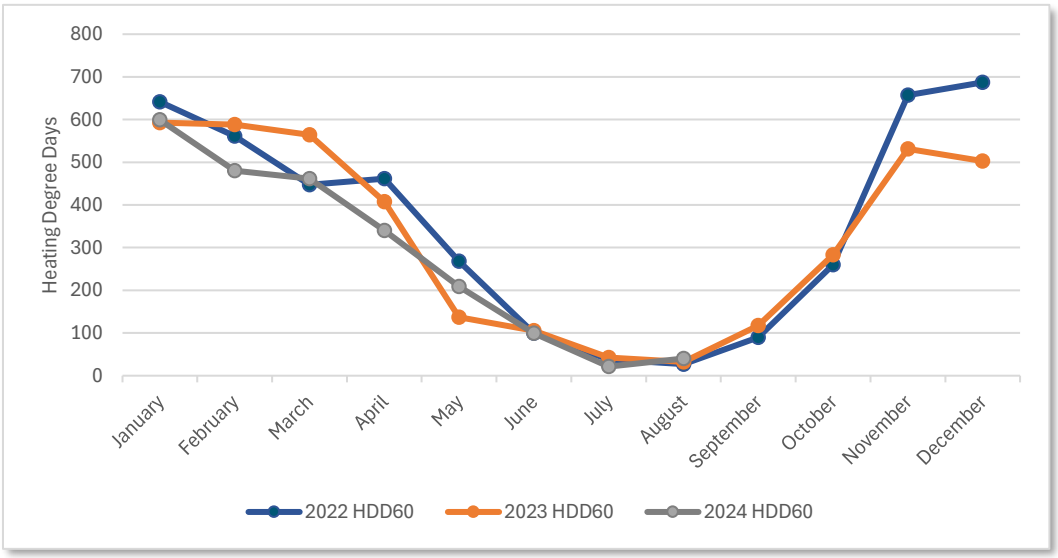
COST PER UNIT OF NATURAL GAS *PSE data from EnergyCAP

During the previous two years there has been a seasonal increase in the cost per unit of natural gas, but the overall cost per unit has remained stable.



HEATING DEGREE DAYS ANALYSIS

Fahrenheit-based heating degree days with base temperatures at and around 60°F were used to help quantify the Cost Avoidance data in the following charts. It is also a helpful reference to consider when viewing year over year utility consumption that is not weather normalized.



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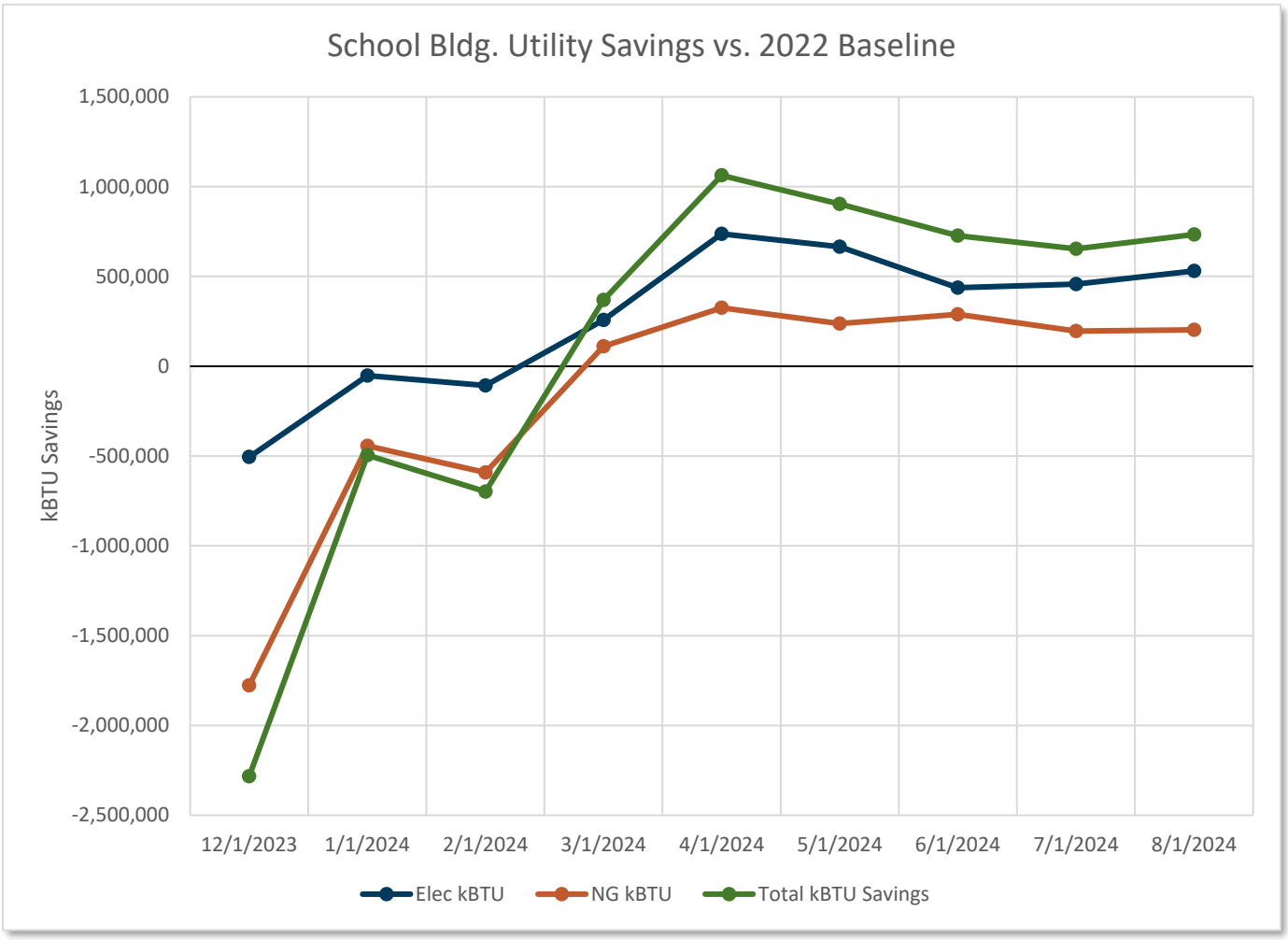
TOTAL ENERGY SAVINGS BY MONTH

Electricity (kWh) and natural gas (Therms) were converted to a common unit (kBtu) to help visualize the energy saved over baseline in the following chart. Standard industry practice for assessing a building's Energy Use Intensity (EUI) used the same methodology.



COST AVOIDANCE

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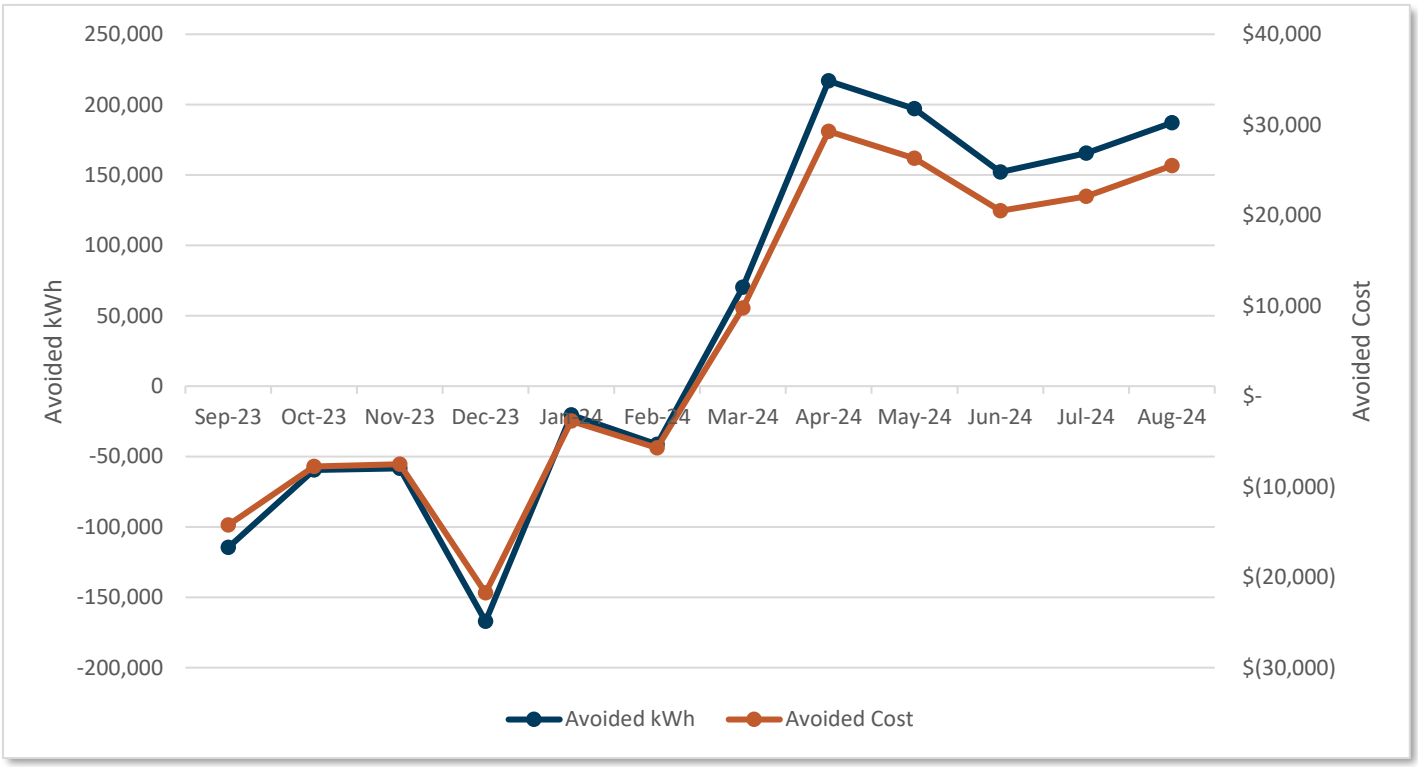
Cost and consumption avoidance refers to the amount of money saved by implementing energy-saving measures compared to what the energy costs would have been without these actions. It represents the difference between the baseline energy cost (what you would have spent) and the actual energy cost after efficiency measures were taken.

AVOIDED ELECTRIC CONSUMPTION AND COST

Actual consumption compared to weather-normalized baseline (calendar yr. 2022) factoring in utility rate ($/kWh)

- $/kWh is based on data from EnergyCAP



Sept ’23 – Aug ’24 Cost Avoided

- Est = $73,000

Dec ’23 – Aug ’24 Cost Avoided

- Est = $103,000

Sept ’23 – Aug ’24 Consumption Avoided

- Est = 527,000 kWh

Dec ’23 – Aug ’24 Consumption Avoided

- Est = 760,000 kWh

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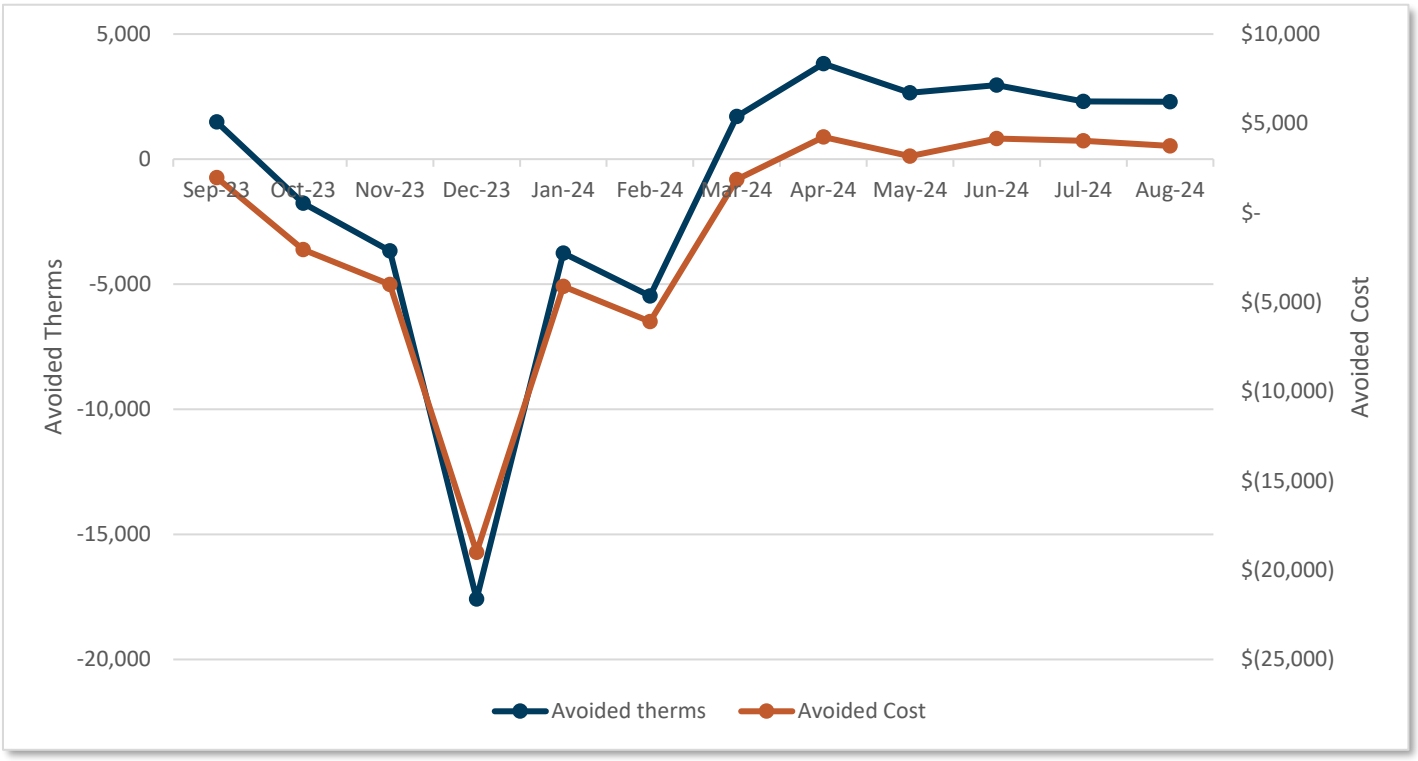
AVOIDED NATURAL GAS CONSUMPTION AND COST

Actual consumption compared to weather-normalized baseline (calendar yr. 2022) factoring in utility rate ($/Therm)

- $/Therm is based on data from EnergyCAP



Sept ’23 – Aug ’24 Cost Avoided

- Est = $ (12,000)

Dec ’23 – Aug ’24 Cost Avoided

- Est = $ (8,000)

Sept ’23 – Aug ’24 Units Avoided

- Est = (15,000) Therms

Dec ’23 – Aug ’24 Units Avoided

- Est = (11,000) Therms

ELECTRICITY SAVINGS BY SCHOOL

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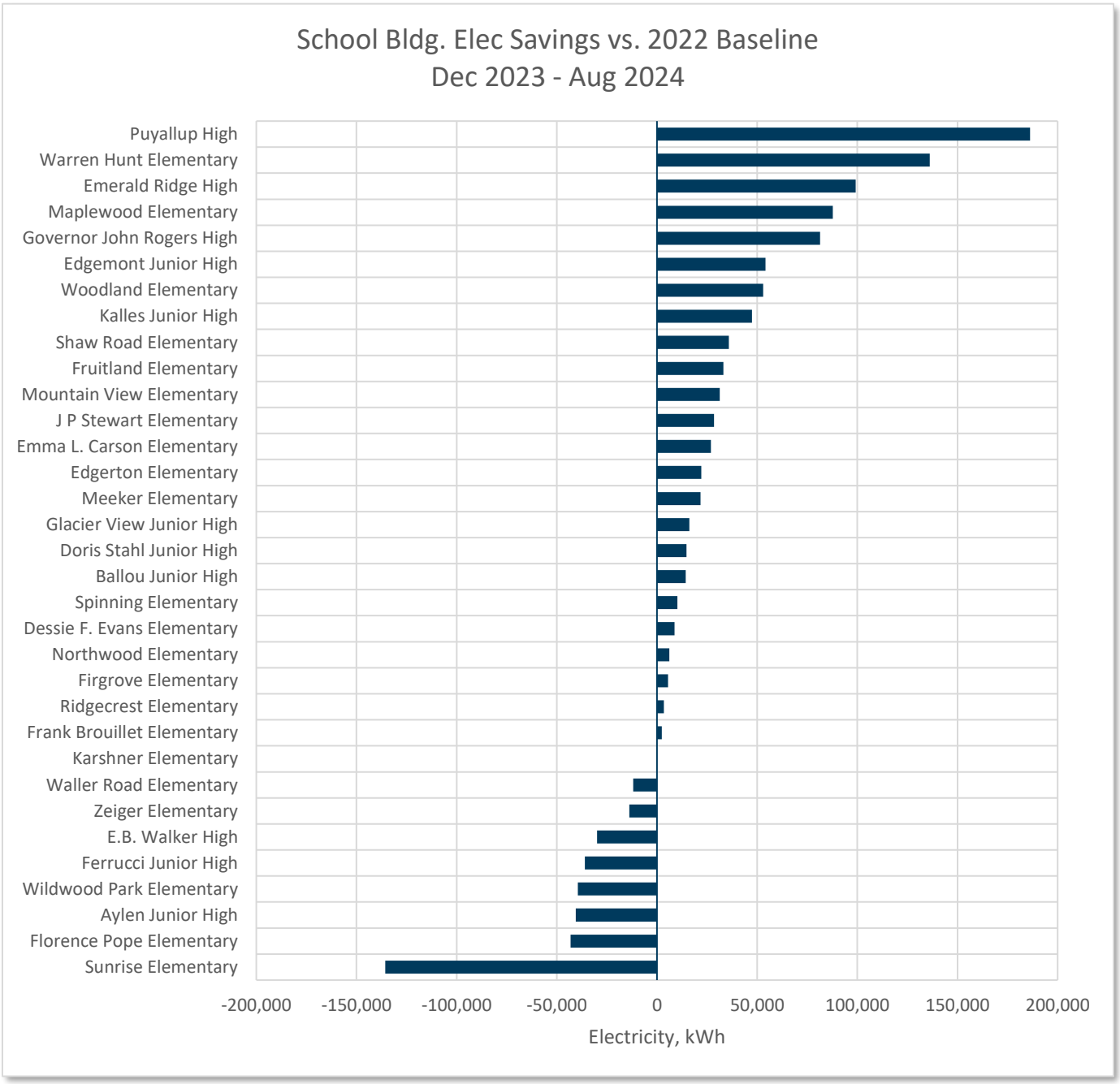

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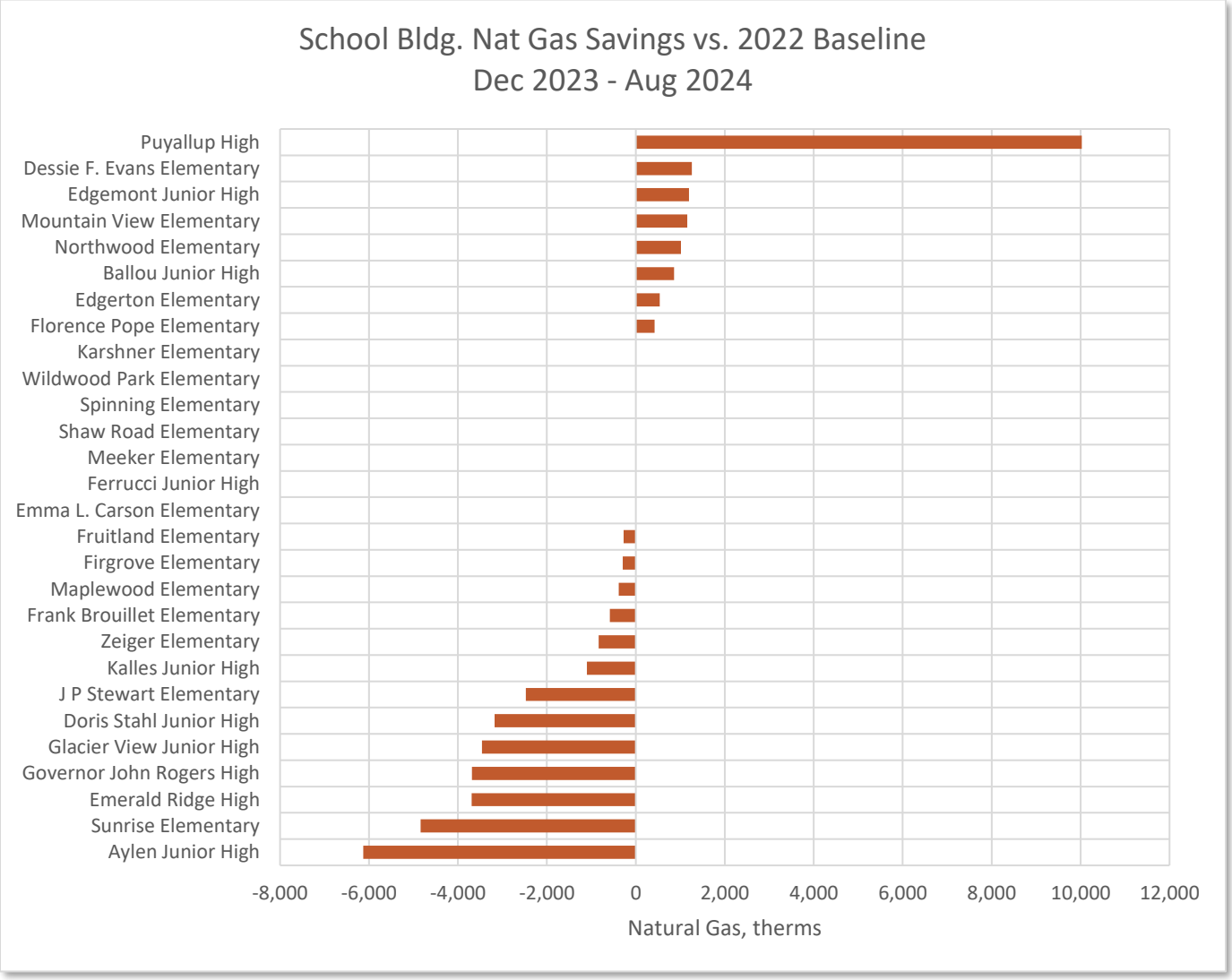
GAS SAVINGS BY SCHOOL



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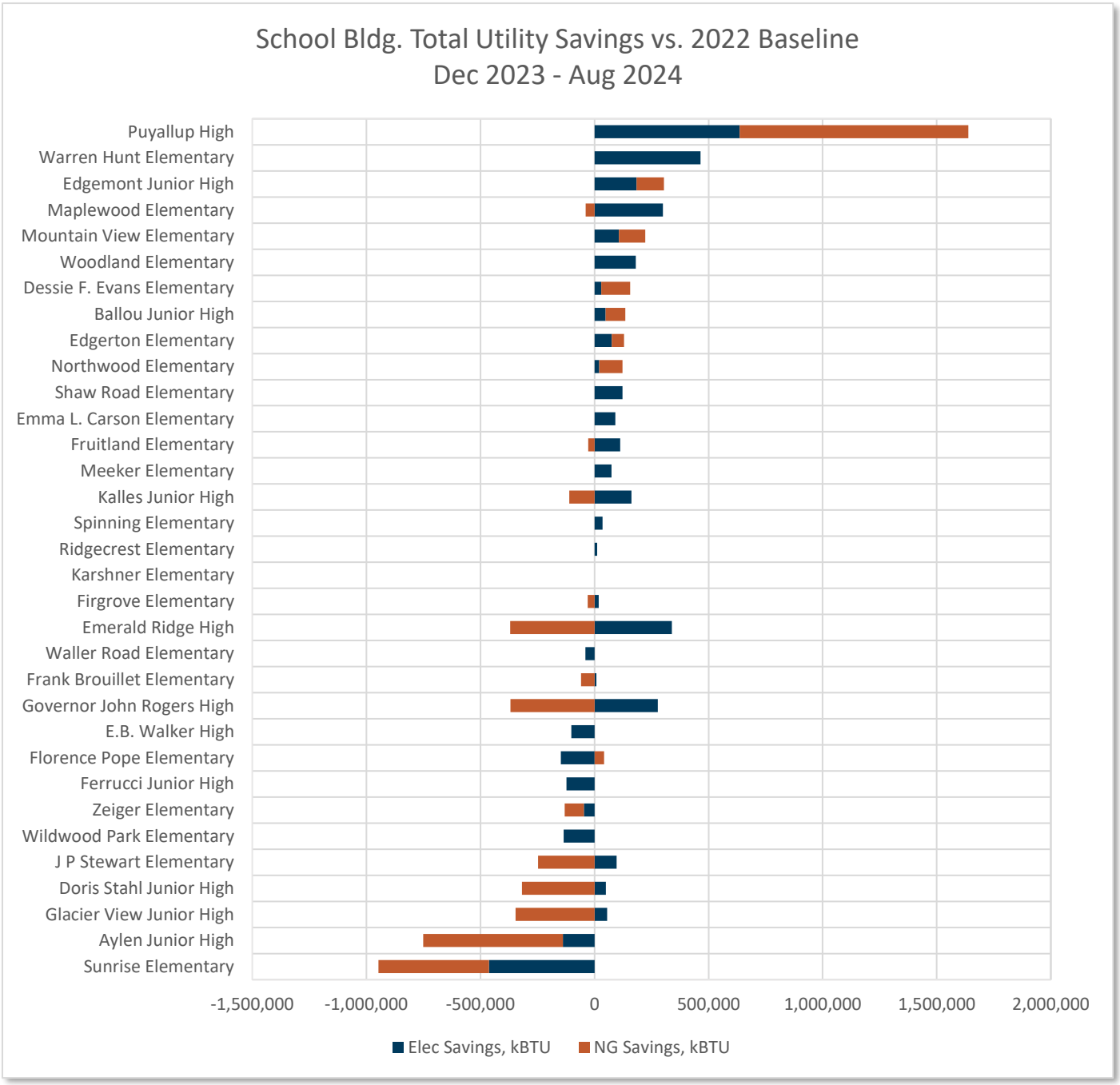
TOTAL ENERGY SAVINGS BY SCHOOL



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