



# ANNUAL ENERGY REPORT FY21-22

**Colorado Springs School District 11**

Website: [www.d11.org](http://www.d11.org) > Departments > Energy and Sustainability



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# TO OUR STAKEHOLDERS

## Executive Summary

This Energy Report provides an overview of the Colorado Springs School District 11 Energy and Sustainability Program. This document includes annual utility expenditures and details the steps taken over the last year to meet the program goals. This Report is provided to the Board of Education as required under Board of Education Policy ECF: *Energy Conservation Management*.

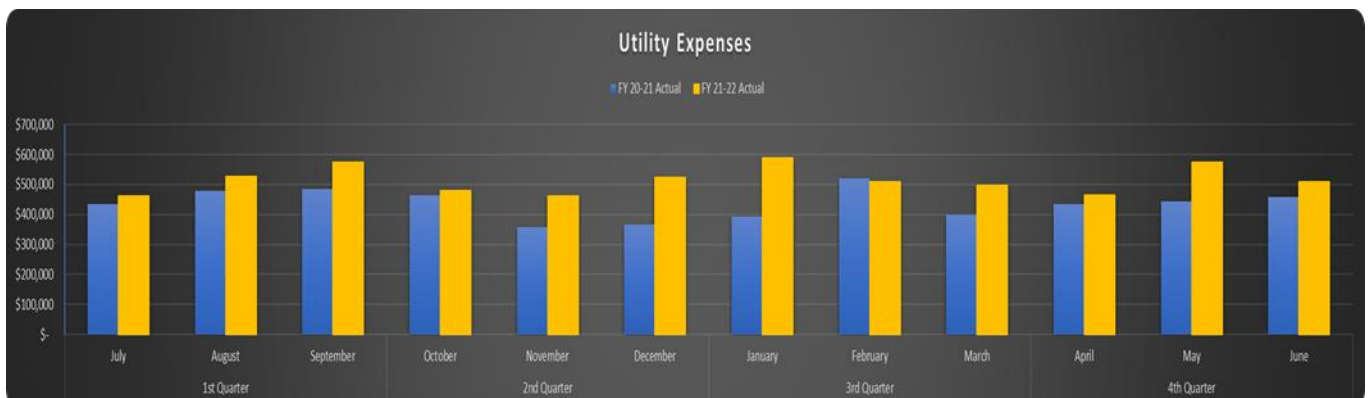
The District 11 Energy and Sustainability program has a long history of successful energy and resource saving initiatives and has received numerous accolades for these efforts. Looking to the future, with the help of the right initiatives and the entire D11 community, we are expecting District 11 to once again be a frontrunner in the field of energy management and sustainability.

## Program Introduction

The District 11 Energy and Sustainability program exists to minimize waste within our facilities. Be it energy, water, raw materials or tax payer dollars, we aim to facilitate the efficient utilization of resources at all District 11 properties. We believe that successfully carrying out this mission is the best way we can support the District's mission to *dare to empower the whole student to profoundly impact our world*.

## Operational Highlights

The 2021-2022 school year (like all years before it) presented a set of unique challenges that we worked to overcome. For our program, this year was marked by unpredictable fluctuations in the natural gas market along with electricity rate increases that were more significant and more frequent than we are accustomed to seeing. The utility outlay for FY22 was over our projected budget by \$145,000 representing an increase of 17.3 % over FY21. The graph below shows the FY22 utility spend compared to FY21.



## KEY TERMS AND ABBREVIATIONS

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**BTU** - *British thermal unit. Unit of energy used in this report to discuss electricity and natural gas consumption*

**District 11 Energy and Sustainability Program**- *Formerly the Resource Conservation Management (RCM) Program*

**EER** - *Energy Efficiency Ratio is an energy performance rating for cooling equipment that compares the cooling capacity of the equipment to the power input. Higher EER = more efficient*

**eGauge** - *The eGauge is a CT meter, which means it can measure the power of individual circuits in your electric panel using sensors called current transformers (CTs). The meter also displays your energy data on a webpage in real-time.*

**Energy** - *This term is used in this report to denote electricity & natural gas consumption*

**FOTC** - *School District 11 Facilities, Operations & Transportation Complex*

**FY 20-21 (or FY21)** - *The 2020/2021 Fiscal Year spanning from July 1, 2020 to June 30, 2021*

**FY 21-22 (or FY22)** - *The 2021/2022 Fiscal Year spanning from July 1, 2021 to June 30, 2022*

**G1C** - *Natural gas service used by our smaller facilities that purchase gas through Colorado Springs Utilities*

**HVAC** - *Heating, ventilation and air conditioning*

**Irrigation** - *Water use outdoors to promote the growth of trees, turf and vegetation*

**Irrigation Controller** - *Computer used to control the irrigation process*

**KBTU** - *1,000 British Thermal Units*

**KBTU per Square Foot** - *Metric that denotes the annual energy consumption of a building relative to its size. Also known as Energy Use Intensity (EUI).*

**Kilowatt** - *1,000 watts*

**LED Lighting** - *Energy-efficient lighting technology. Stands for 'light-emitting diode'*

**Set Point** - *The space temperature that HVAC equipment is programmed to maintain*

**Transport Natural Gas** - *Natural gas that is purchase from 3<sup>rd</sup> party providers and transported to Colorado Springs through underground pipelines*

**Utilities** - *In this report, this term refers to gas, water & electricity*

**Watt** - *a unit of power used to describe how quickly energy is flowing from one point to another*

**Weather Corrected Data** - *Energy consumption data that has been adjusted to remove abnormalities associated with weather that is warmer or cooler than normal.*

## D11 ENERGY RELATED CHARACTERISTICS

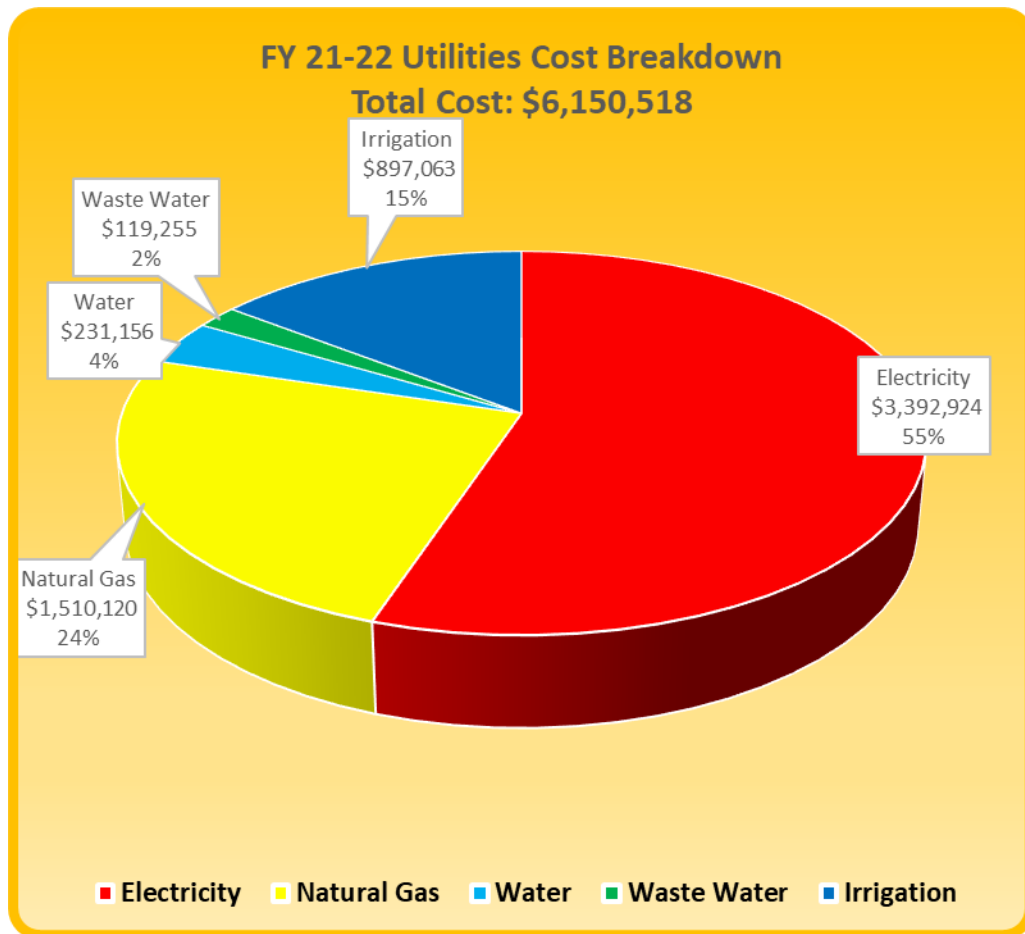
Energy-Related Characteristics of School District 11	
FY 20-21	FY 21-22
3,826,482 square feet	3,826,482 square feet
48 schools (4 HS, 9 MS, 33 ES, 2 ALT)	48 schools (4 HS, 9 MS, 33 ES, 2 ALT)
39 schools with air conditioning	40 schools with air conditioning
1 Stadium / 11 Support Buildings	1 Stadium / 11 Support Buildings
Approximately 46,183 computers	Approximately 46,183 computers
Energy Performance Statistics of School District 11	
FY 20-21	FY 21-22
Average energy use of <b>84.5 KBTU</b> per square foot (5.56% increase from previous 3 yr average)	Average energy use of <b>85.7 KBTU</b> per square foot (4.78% increase from previous 3 yr average)
Average energy cost of <b>\$1.06</b> per square foot (2.87% increase from previous 3 year average)	Average energy cost of <b>\$1.28</b> per square foot (23.21% increase from previous 3 year average)
Annual Energy Cost Per Student: <b>\$183.28</b> (12.57% increase from previous 3 year average)	Annual Energy Cost Per Student: <b>\$228.27</b> (26.04% increase from previous 3 year average)
Annual Utilities Expense Total	
FY 20-21	FY 21-22
Utility Bill Total: \$5,243,722	Utility Bill Total: \$6,150,518

*It should be noted that during FY 21-22 we increased the ventilation throughout the schools to improve indoor air quality (IAQ) in order to combat COVID-19 and provide our students with a safe and healthy environment. The result of this change in our ventilation schedules is reflected in higher than normal average energy use and costs. As of May 2022, we have returned our ventilation schedules to their normal routines.*

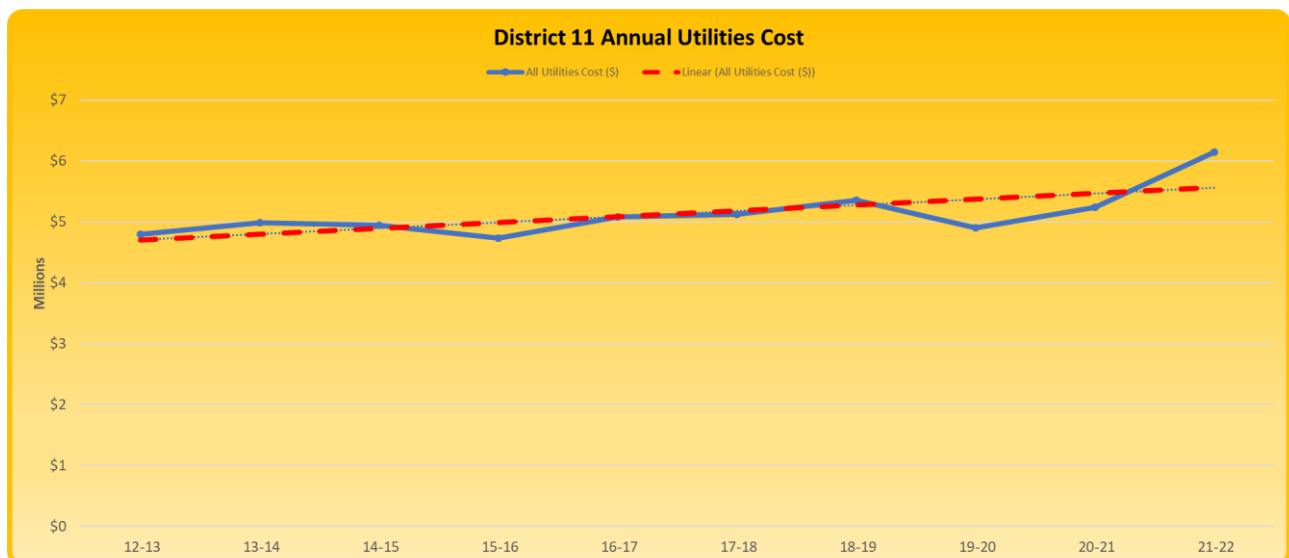
*"The Colorado Springs School District 11 Board of Education (the Board) recognizes that it is important that Colorado Springs School District 11 (the District) be ecologically responsible by conserving non-renewable energy resources thereby minimizing energy pollution damage to our environment. It is equally important, as a steward of public taxes, for the District to prevent wasted dollars being diverted away from District's educational mission"*

## OVERVIEW OF UTILITIES

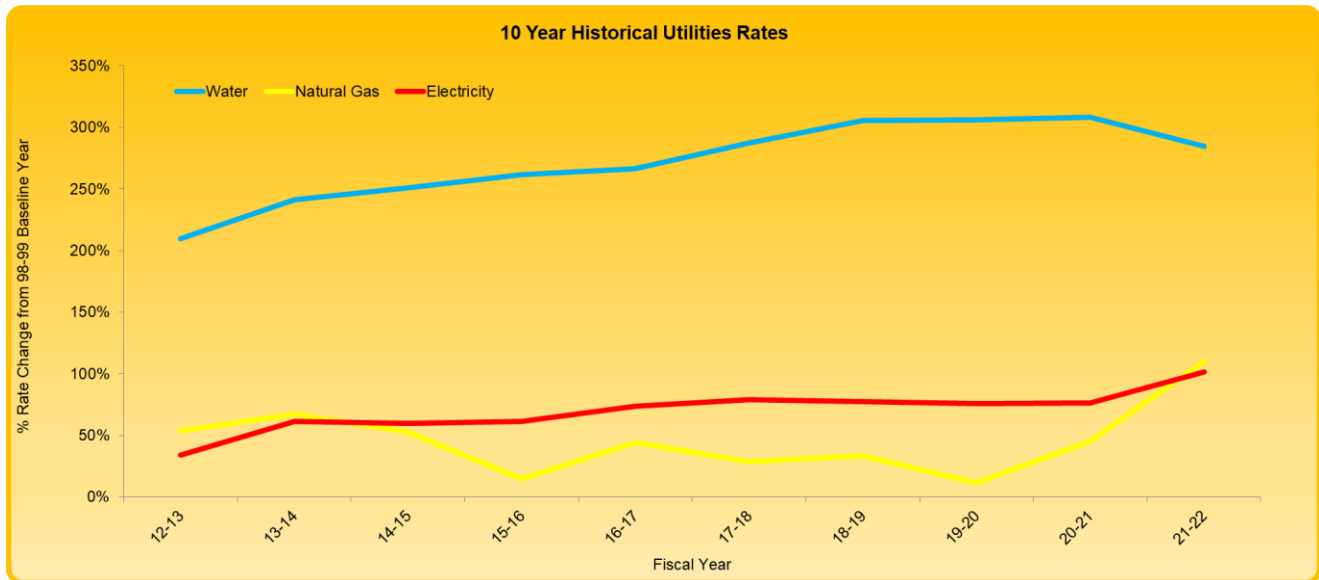
The chart below shows utilities outlays for the 21-22 fiscal year.



The utilities expenditure for FY 21-22 reflects an increase of 28% over the last 10 years.  
(Trendline shown in red on the graph below)



## Utilities Rates



The utilities rate fluctuations experienced by School District 11 over the last 10 years (shown in the graph above) are precisely why the Energy and Sustainability Program exists. These commodities will likely continue to increase in price in the coming years. With continued active oversight and management, we are aiming to:

- Curtail the consumption of non-renewable resources
- Minimize the impact of inevitable utilities rate increases
- Divert taxpayer dollars back to the classroom to directly empower students

Utility rates over the past year when compared to the previous year reflected significant changes in most utilities:

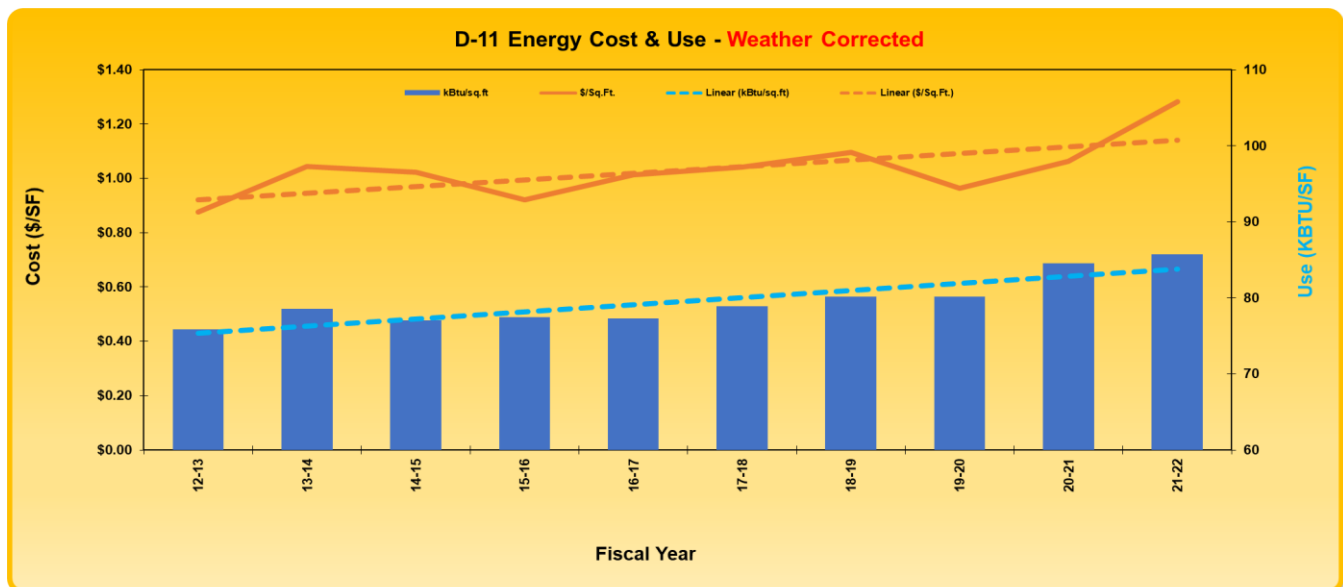
- Electric rates were up 34% over the previous period (FY21)
- Natural gas rates were up 49% over the previous period (FY21)
- Water rates remained flat over the previous period (FY21)



## Energy Rate & Use

Twenty-one (21) years ago, the District 11 Board of Education undertook the commitment to responsibly manage the use of our resources with regards to energy and water use. Since that day, District 11 has been carefully tracking the energy efficiency of our schools and facilities. This procedure for this involves monitoring the gas, electricity, and water consumption (and associated costs) at each District facility, then comparing those values with historical District 11 values as well as local and national average values for K-12 schools.

We use this data to assess the performance of the District as a whole, as well as individual buildings. This method enables the Energy and Sustainability Program team to identify lower performing buildings (where the greatest energy saving opportunities exist) and assess the ongoing efficacy of previous energy efficiency projects. Below is a graph comparing our District-wide performance last year to previous program years.

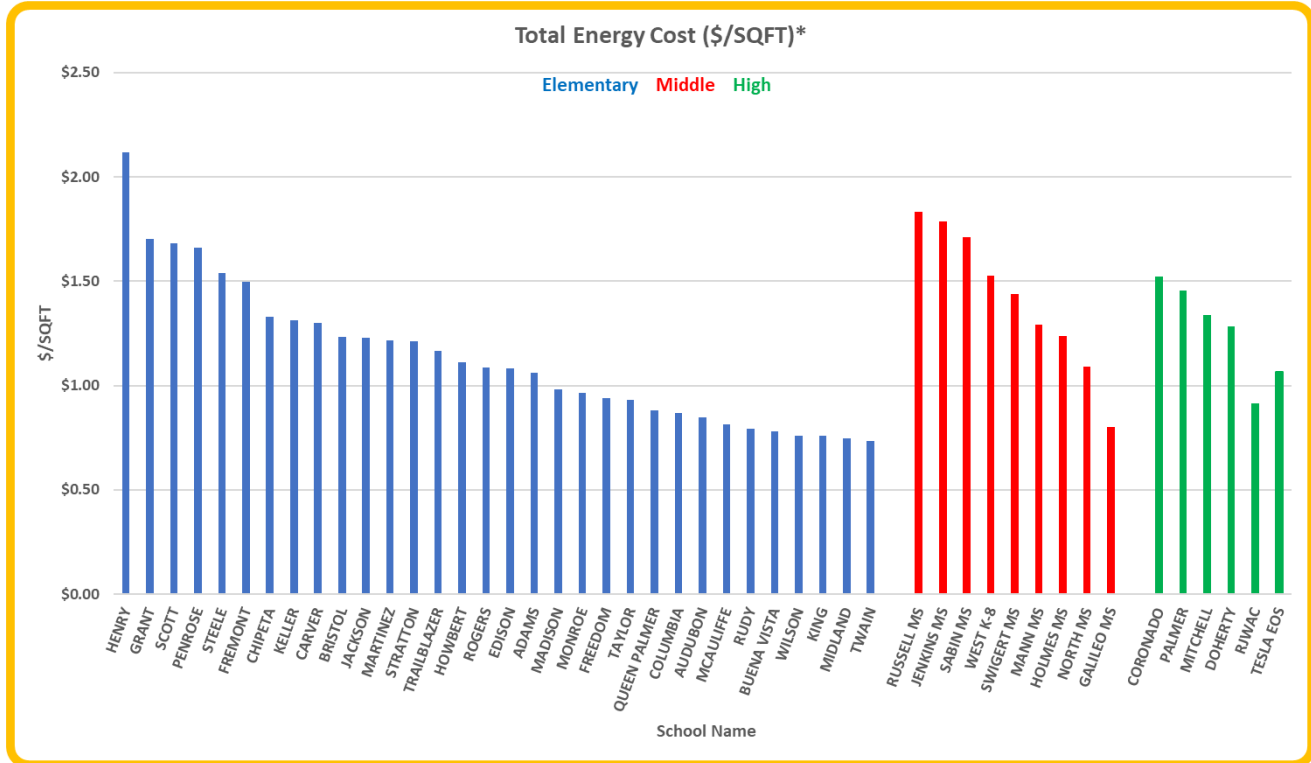


*Note that the above data is 'weather corrected'. This method allows us to normalize the data and accurately compare facility performance across multiple years while correcting for temperature variances each year.*

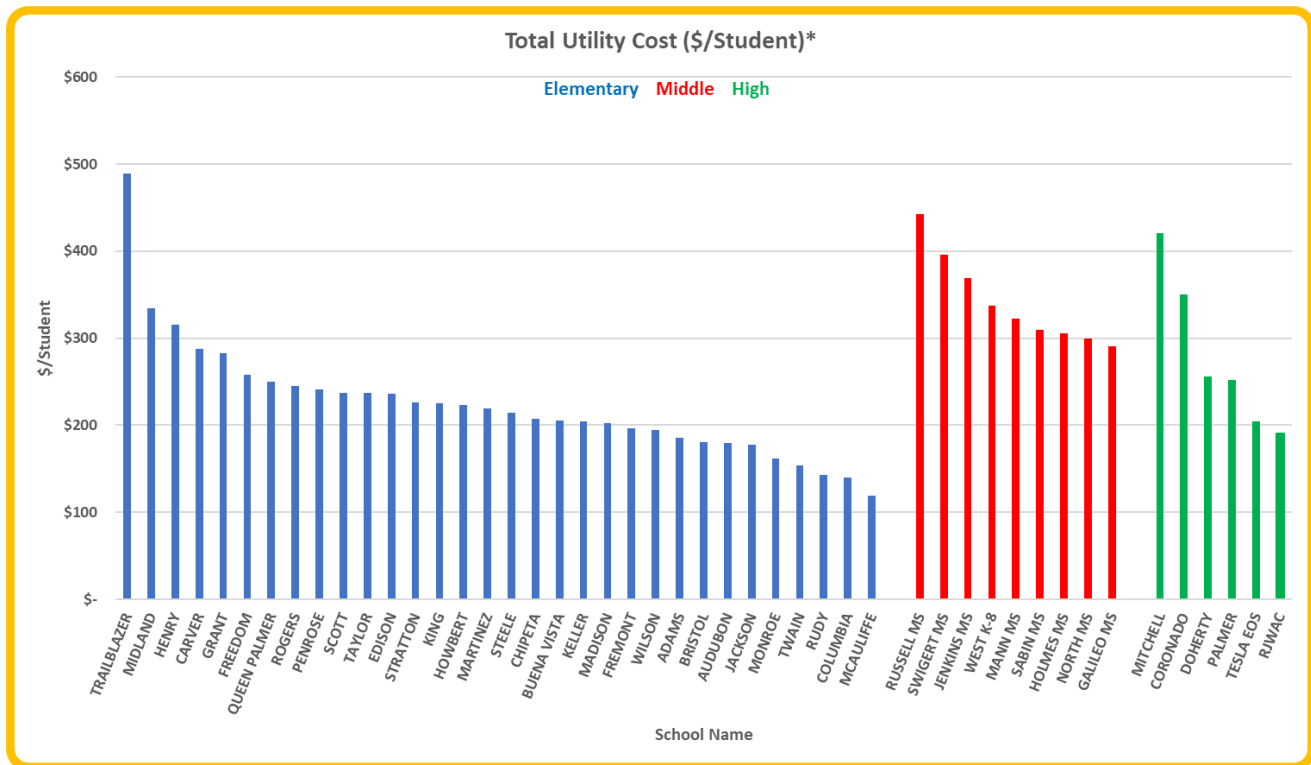


## School-Specific Energy Metrics

The chart below shows the District's annual Energy cost (\$) per square foot (sqft).

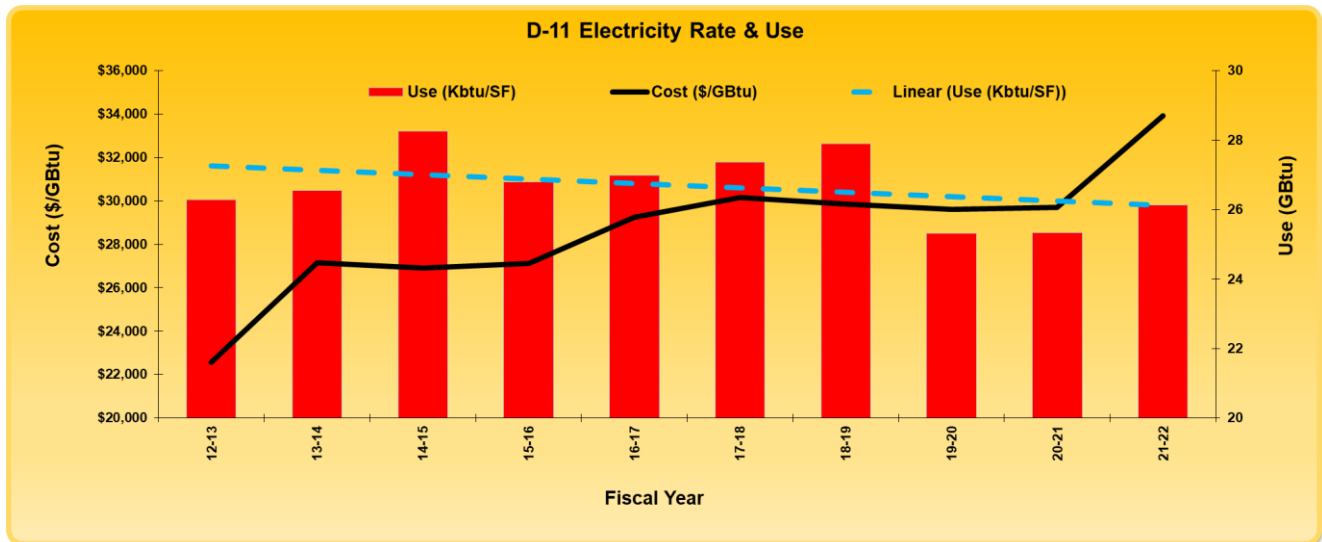


The chart below shows the District's annual Energy cost (\$) per student at current enrollment.



(data has been weather corrected)

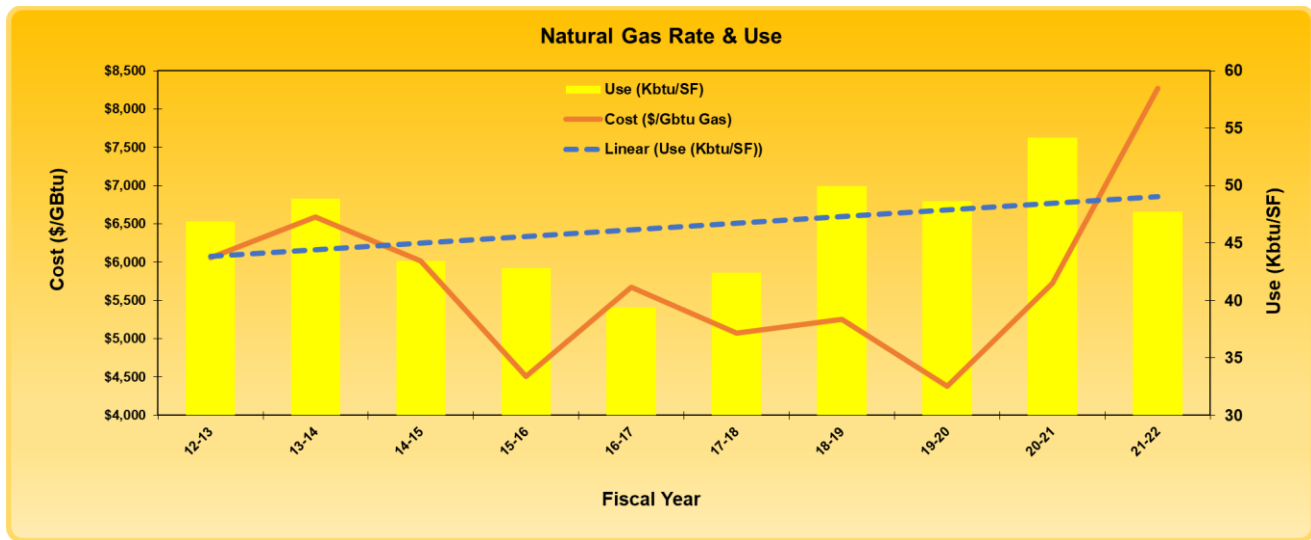
## Electricity Rate & Use



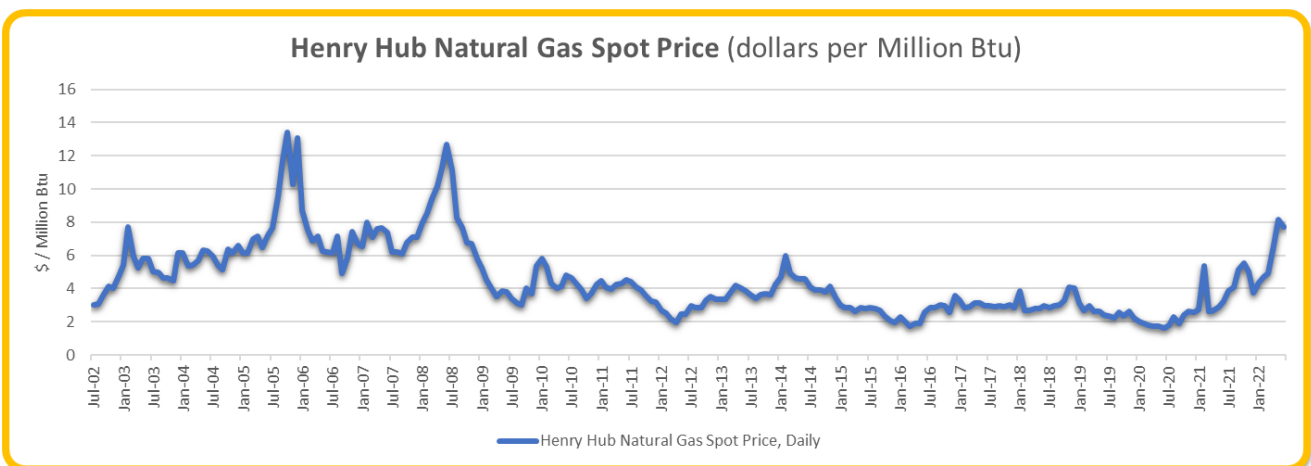
The graph above reflects the price paid for electricity (black line) and the electricity consumed (red bars) by District 11 during the last ten years.

Electricity has long-been our largest utility expense. Although we have experienced an increase in our electric rates in the last ten years, we have been able to partially offset those increases with a slight decrease in our electrical consumption during the same period (see blue trendline above). It should be noted that throughout the ten-year period represented in the graph above, District 11 added air conditioning to ten of our schools, with the most recent addition being Madison Elementary. This is an important enhancement to the learning environment that inherently increases the electricity consumption of our buildings.

## Natural Gas Rate & Use



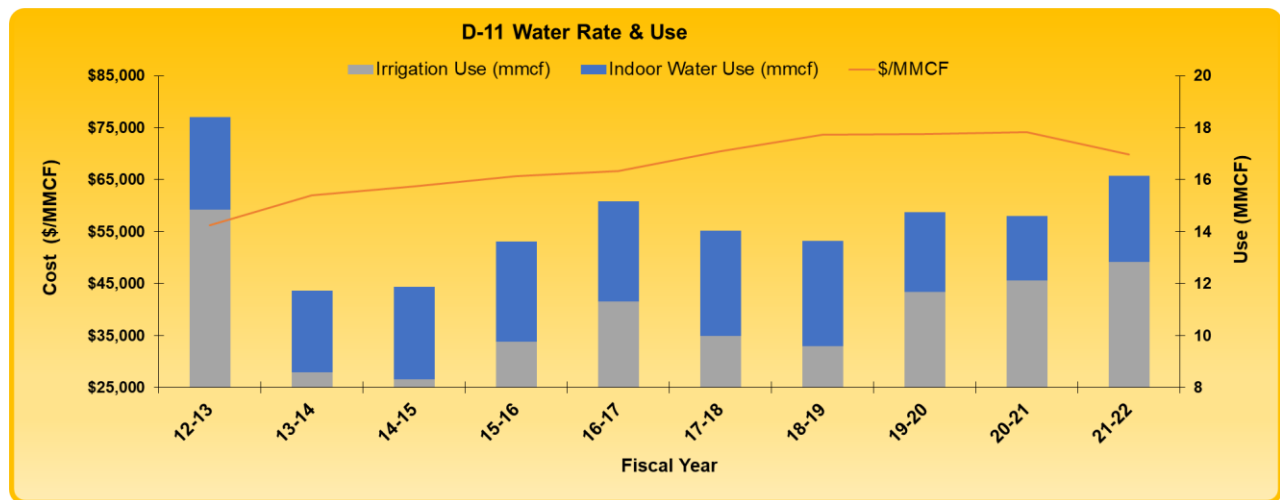
The volatility of the natural gas market has often presented a challenge for our department. Each year we create a projected annual utility budget for the entire District which forces us to estimate natural gas rates for the upcoming year. While we are never able to predict the exact market fluctuations, we can often use historical data to get close enough to produce a price range that allows us to assemble our utility budgets. The last two fiscal years (FY21 and FY22) have presented us with significant weather events (locally and nationally) and subsequent inconsistencies in both the rates and availability of natural gas.



The graph above shows the market price of natural gas over the last twenty years and portrays the inherent volatility of the natural gas commodity. Due to the constant fluctuations of natural gas pricing, the District must continue to carefully monitor the procurement and use of natural gas.

## Water Rate & Use

In addition to tracking the energy consumption of District buildings over the past 20 years, our department has closely monitored water consumption at our properties. During any given year, approximately 70% of the District's water use is irrigation-related. Our demand for water varies from year to year based on rainfall, water restrictions, temperature, etc. The graph below shows District 11's relatively consistent water consumption over the last 10 years alongside the rapidly increasing cost of water during that the same period.

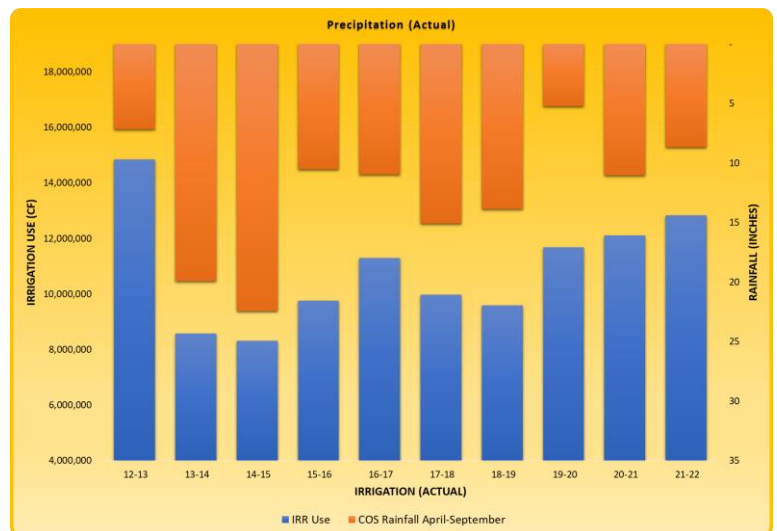


*\*Note: MMCF = Million Cubic Feet*

As shown on the “Historical Utilities Rates” graph on page 8 of this report, the rate District 11 pays for water has increased by 285% in the last 23 years. In an effort to reduce the impact of this seemingly perpetual increase, The Energy and Sustainability Department personnel are constantly pursuing ways to curtail the District's water use.

In some cases, this use reduction can be achieved without a capital expense. Each month, District Utility bills are carefully examined to search for anomalous data that might point to a problem in one of our facilities.

In the graph shown to the right, we compare our annual rainfall occurring during watering season (orange bars) with irrigation water use (blue bars). Looking at the data in this format helps us conclude that the gradual increase in irrigation water use coincides with the gradual decrease in annual rainfall during the period represented above.



After recognizing the upward trend of water use and the probable water rate increases in the future, we set out to find a more advanced irrigation controller that could be installed at all District facilities to ensure we were not wasting water during our irrigation process. After evaluating multiple products, the decision was made to standardize on WeatherTrak smart irrigation controllers. We expect these controllers to yield significant water and maintenance savings for the District. These controllers will utilize local weather data to optimize our irrigation process based on environmental conditions that exist on a given day. We expect to install these controllers at the majority of District schools over the next two years.

One exciting initiative on the horizon is the conversion of two District high school athletic fields (Coronado and Doherty) from Kentucky Blue Grass to artificial turf. In addition to an aesthetic improvement for each site, this conversion will provide the District with substantial maintenance and water savings. This idea was supported by the District 11 community in our recent Facilities Master Plan dialogue. We expect each converted field to yield approximately \$11,000 in annual water savings for the District.

## ENERGY SAVINGS HIGHLIGHTS

In addition to managing the \$6 million annual utility budget, the District 11 Energy and Sustainability Program team either assisted with or implemented the following energy savings projects during the 2021-2022 fiscal year:



**Fremont Elementary** - Relamped the interior and exterior with LED - expected savings of \$8,000 / year (photo to the left)

**FOTC Campus Wide Exterior Lighting** - Relamped all exterior building and parking lot lights with LED in FY 20-21 - and realized a savings of \$6,600 in the first year. (photo to the right)



**Chipeta Elementary Gym** - Relamped the gymnasium with LED

**Rudy Elementary Gym** - Relamped the gymnasium with LED (photo to the right)

**Mann Middle School** - Relamped the exterior lighting with LED



Completed monthly utility bill audits resulting in the discovery of faulty meters, over-charges, system leaks, malfunctioning equipment, etc.

## Rebates

Colorado Spring Utilities provides their customers with rebates and incentives for implementing energy and water saving measures. The District 11 Energy and Sustainability Program team is continually looking to implement projects that would qualify for these rebates.

The projects listed above (and others like them) have netted approximately \$9,500 in rebate checks from Colorado Springs Utilities this year. This brings the total received over the last five (5) years to approximately \$61,500.





## Capital Projects - Energy Savings Highlights

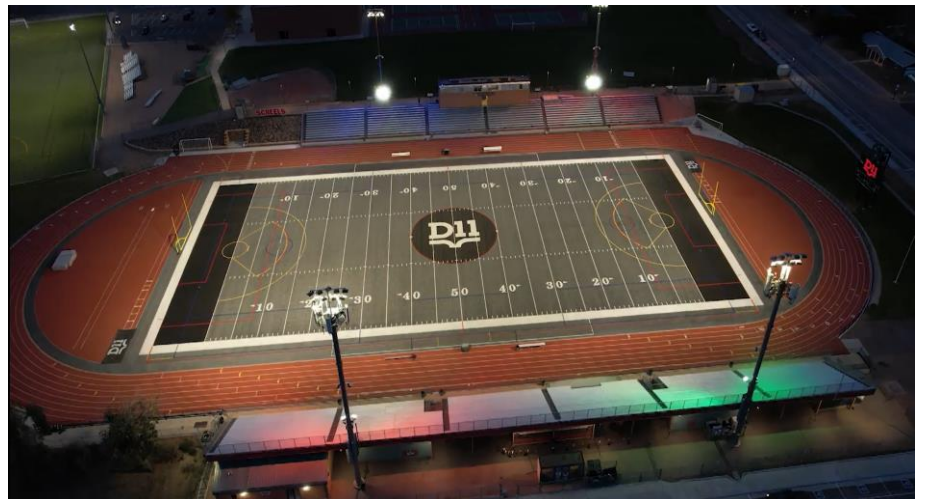
In addition to the above-mentioned projects completed by the energy & sustainability program, the District's Capital Program team completed several projects this year that will result in an energy savings to the District. These projects are value-added building improvements that help to create an environment for our students where they feel empowered to profoundly impact our world.



**Madison Elementary** - Replaced boilers with new high efficiency boilers. (photo to the left)

**Main Administration Building** - Replaced all exterior lighting and parking lot lighting with new LED fixtures - expected savings of \$1,300/year.

**Garry Berry Stadium** - Relamped the field lighting with LED - expected savings of \$3,650/year. (photo to the right)



**Carver Elementary** - Replaced a roof top unit (RTU) that has a higher Energy Efficiency Ratio (EER), thus saving the District energy dollars, along with new high efficiency motors on all return fans. (photo to the right)



**Doherty High School** - Replaced a roof top unit (RTU) that has a higher EER, thus saving the District energy dollars, along with new high efficiency motors on all return fans. (photo to the left)

## LOOKING AHEAD

Each year, the District 11 Energy and Sustainability Department personnel closely analyze District 11 facilities in an ongoing effort to increase the efficiency of our buildings and decrease our environmental footprint. This year, this analysis has prompted us to pursue several exciting initiatives that promise to yield energy and water savings for years to come. The initiatives that are planned for this school year include:

- Energy Performance Contract. After conducting market research through the issuance of an RFI (request for information), we have elected to move forward with an RFP (request for proposal) for an energy performance contract. This service is provided by *Energy Service Companies* that specialize in the evaluation and subsequent improvement of facilities. We hope that this effort will result in a noticeable improvement in the efficiency of the buildings that are audited. Both the initial assessment and any improvements must be approved by the Board of Education.
- Lighting upgrades. This school year we are planning to upgrade the lighting at the following properties: Jenkins MS parking lot & gymnasium, Mitchel HS main gymnasium & cafeteria, RJWAC cafeteria/commons area, Keller ES parking lot, Chipeta ES parking lot, Penrose ES parking lot, King ES parking lot, and Scott ES parking lot.
- Irrigation controller upgrades. This year we plan to replace several existing irrigation controllers with ‘smart’ irrigation controllers with flow-sensing capabilities. This upgrade will provide significant water savings, provide more granular water consumption data, and save our landscape crew members valuable time throughout the watering season. Described in detail on page 13 of this report.
- Installation of real-time electricity meters: With the installation of ten additional meters this year, we now have the ability to monitor real-time electricity consumption at twenty-three District facilities. We have used the data collected thus far to work with District tradesmen to optimize the scheduling of various equipment including: building ventilation, heating, cooling, and diesel engine block heaters.

We are looking forward to implementing this year’s initiatives and believe that each of these endeavors are will result in a more efficient and sustainable District 11!