

# ANNUAL ENERGY REPORT FY20-21

**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

Colorado Springs School District 11 sits in the heart of the City and is defined by its innovation, diversity, commitment to service, and passion for helping students grow and succeed. In addition to being the longest standing school district in the Pikes Peak region, D11 is also one of the largest school Districts in the state. During the 20-21 school year, District 11 staff served a population of over 26,000 students. Our students are not only achieving academic excellence but are also becoming equipped to lead and succeed in a diverse society. We believe that innovation coupled with passion can change students' trajectories.

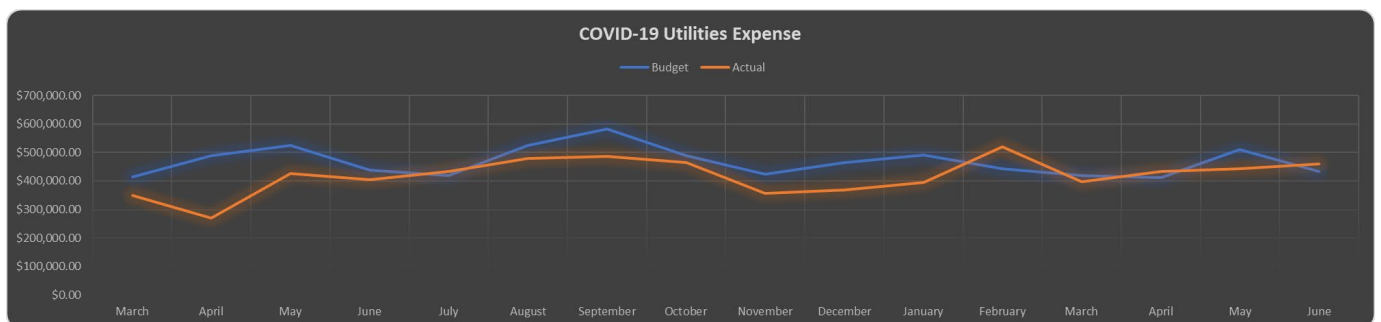
The rich history of School District 11 comes with a unique set of challenges. One such challenge is maintaining an infrastructure that is significantly older than our neighboring school districts. With an average building age of 54 years, Colorado Springs School District 11 has the oldest facilities of any school district in El Paso County. The Energy and Sustainability Program is continually looking for ways to optimize our aging infrastructure by implementing modern materials and equipment that are more efficient and reliable than what was previously available. This is an ongoing pursuit and a key component of our Program's charter.

## Operating Highlights

COVID-19 has directly impacted the utilization of our schools. Over the past two years, District 11 has implemented both remote and hybrid learning models. Additionally, in an effort to improve the Indoor Air Quality (IAQ) in our facilities, D11 elected to increase the ventilation in our buildings. The increased ventilation resulted in an increased consumption of both electricity and natural gas within our buildings. This increase was partially offset by the time spent implementing remote learning. When students are learning from home, and our schools are vacant (resulting in reduced ventilation and less stringent temperature set points) we experience utility savings.

Looking at the overall budget for FY20-21, the end of the fiscal year saw a utility spend under budget by \$451,300, with only a slight increase of 6.8% over FY19-20. The majority of this expense was seen in February 2021 when the price of natural gas soared to unprecedented levels due to Storm Uri, which shut down major portions of the country and the supply of natural gas.

The graph below shows the utility spend since March 2020, the beginning of the COVID-19 pandemic.



## 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*

**eGuage** - *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** - *The 2020/2021 Fiscal Year spanning from July 1, 2020 to June 30, 2021*

**FY 19-20** - *The 2019/2020 Fiscal Year spanning from July 1, 2019 to June 30, 2020*

**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

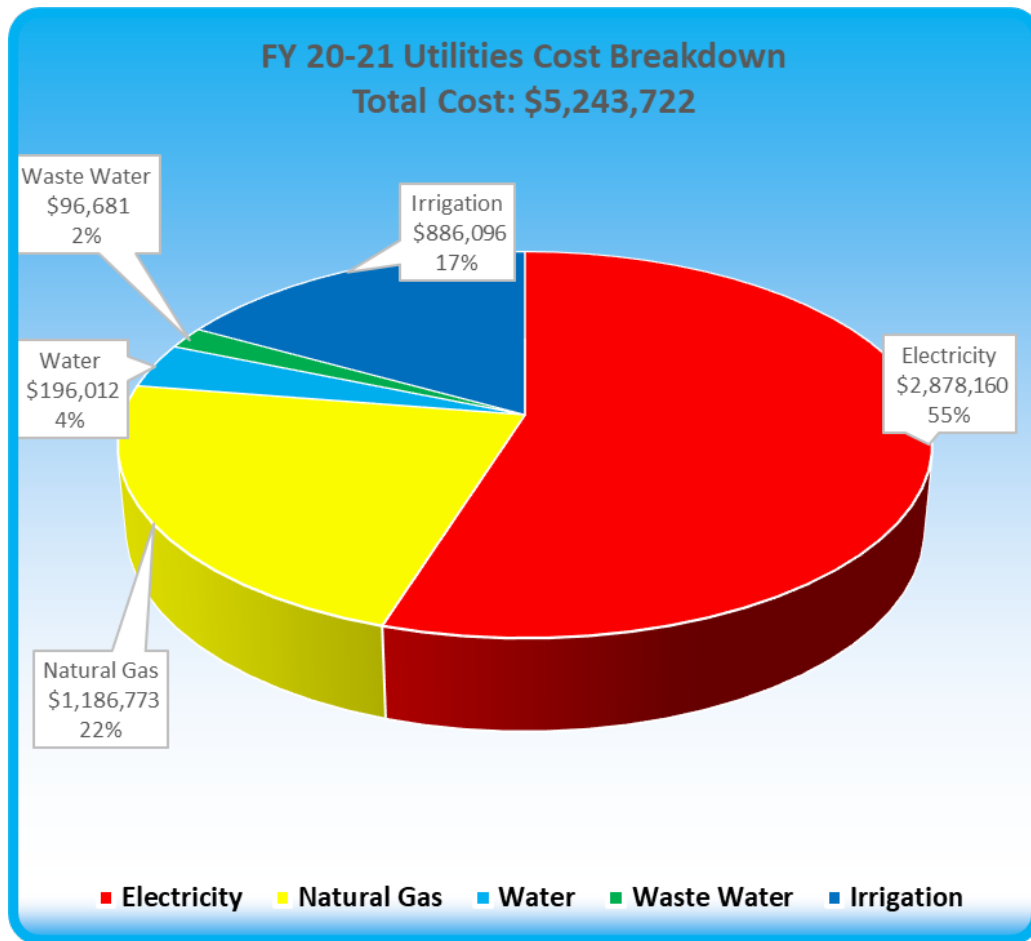
Energy-Related Characteristics of School District 11	
FY 19-20	FY 20-21
3,852,578 square feet (schools only)	3,852,578 square feet (schools only)
47 schools (4 HS, 9 MS, 33 ES, 1 ALT)	47 schools (4 HS, 9 MS, 32 ES, 2 ALT)
38 schools with air conditioning	39 schools with air conditioning
Approximately 46,183 computers	Approximately 46,183 computers
Energy Performance Statistics of School District 11	
FY 19-20	FY 20-21
Average energy use of 72.90 KBTU per square foot (3.53% decrease from previous 3 yr average)	Average energy use of <b>79.5 KBTU</b> per square foot (7.30% increase from previous 3 yr average)
Average energy cost of \$0.95 per square foot (4.81% decrease from previous 3 year average)	Average energy cost of <b>\$1.06</b> per square foot (2.91% increase from previous 3 year average)
Annual Energy Cost Per Student: \$148.99 (3.72% decrease from previous 3 year average)	Annual Energy Cost Per Student: <b>\$158.10</b> (6.11% increase from previous 3 year average)
Annual Utilities Expense Total	
FY 19-20	FY 20-21
District-wide Utility Bill Total: \$4,909,065	District-wide Utility Bill Total: <b>\$5,243,722</b>

It should be noted that during FY20-21 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.

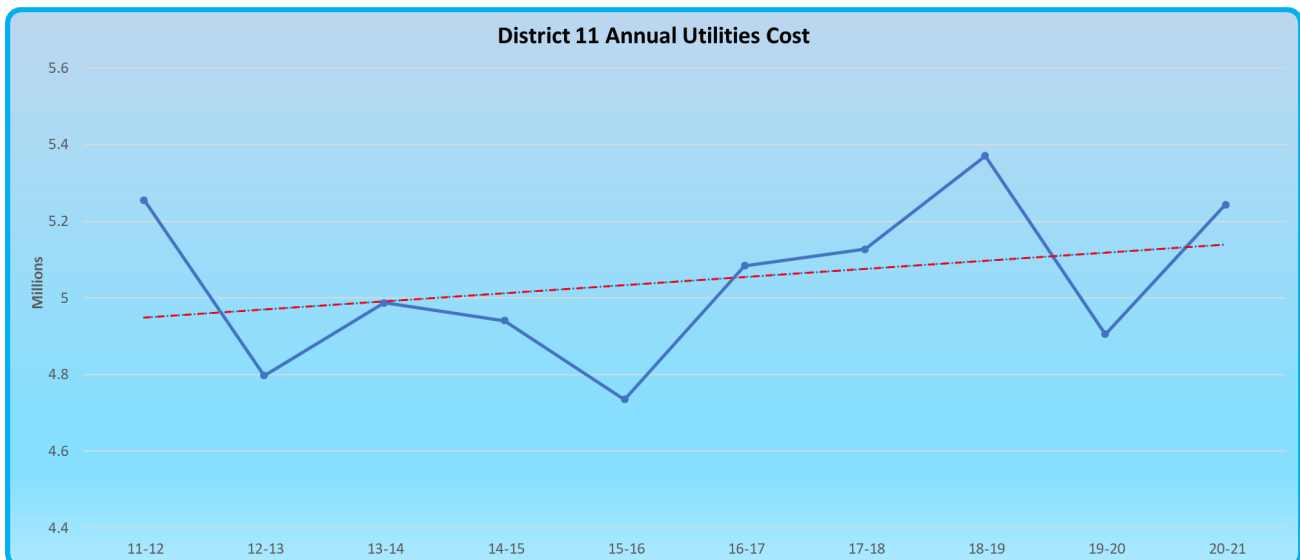
*"The Colorado Springs School District 11 Board of Education (the Board) recognizes that it is important that Colorado Springs School District 11 (the District) be ecologically responsible by conserving non-renewable energy resources thereby minimizing energy pollution damage to our environment. It is 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

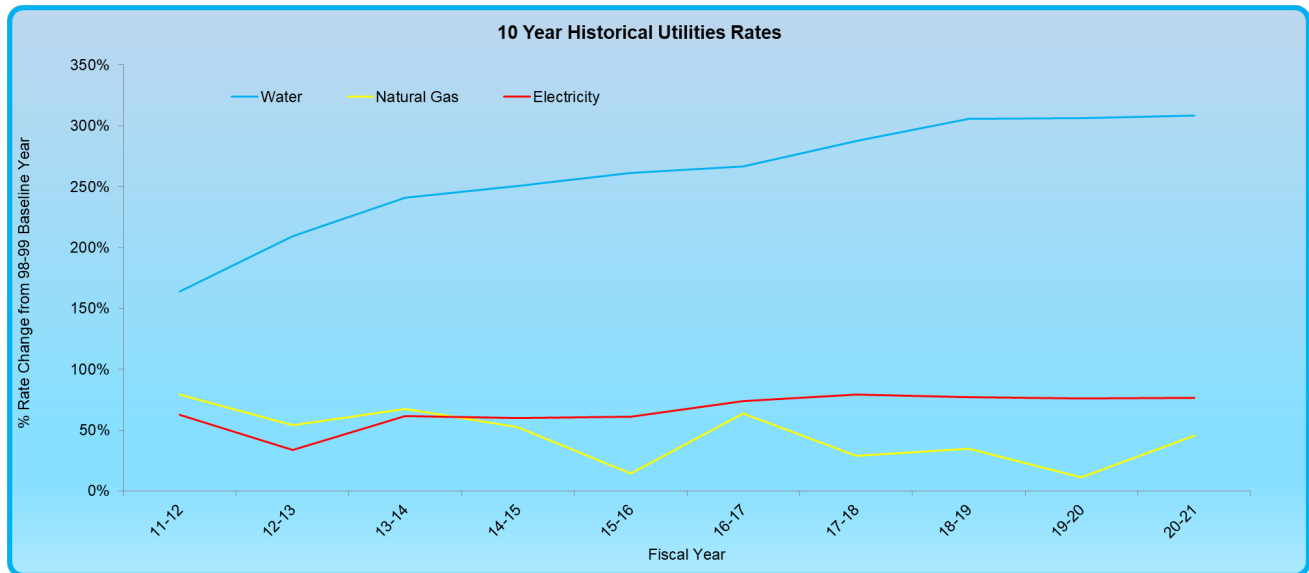
The chart below shows utilities outlays for the 20-21 fiscal year.



The annual utilities expenditure has remained near the \$5 million mark for 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:

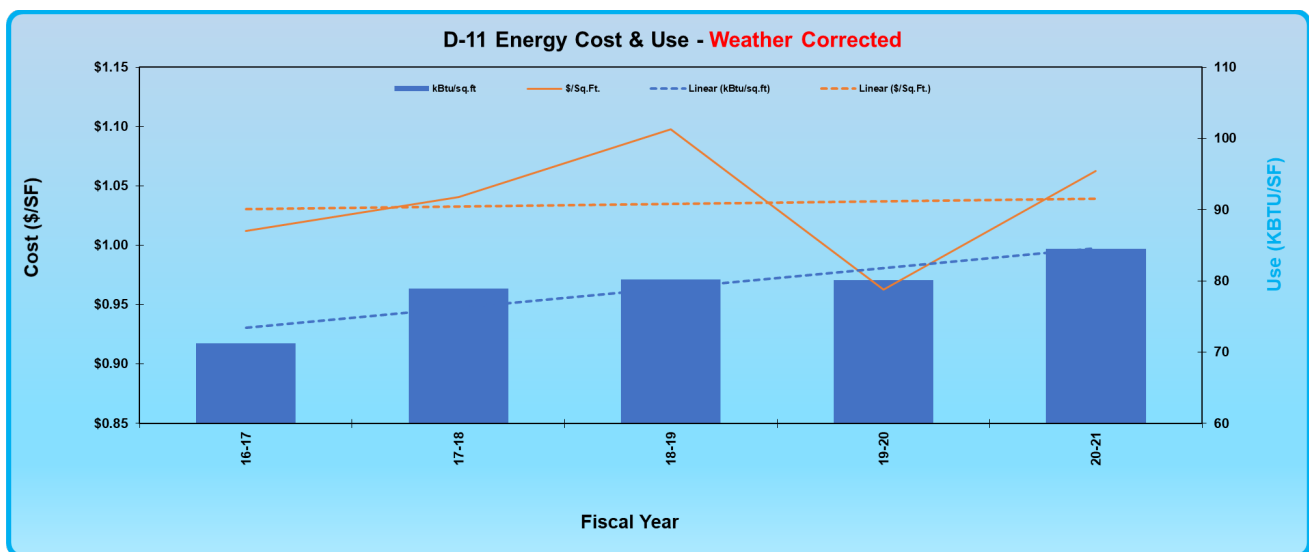
- Curtail the consumption of non-renewable resources
- Minimize the impact of inevitable utilities rate increases
- Divert taxpayer dollars back to the classroom to directly empower students



## Energy Rate & Use

For the last 21 years, District 11 has been carefully tracking the energy efficiency of our schools and facilities. The District's standard 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 four previous program years.

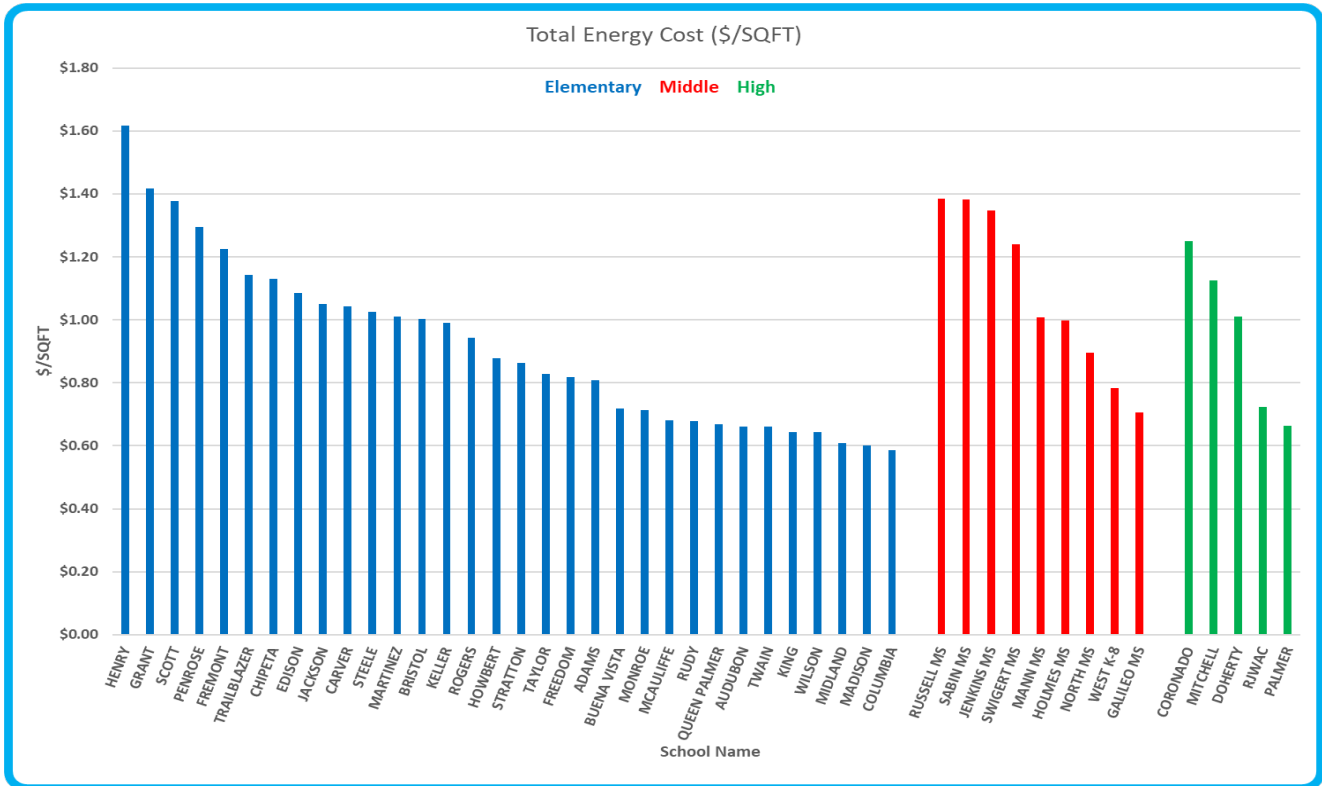


Note that the above data is 'weather corrected'. This method allows us to normalize the data and accurately compare facility performance across multiple years while correcting for temperature variances each year.

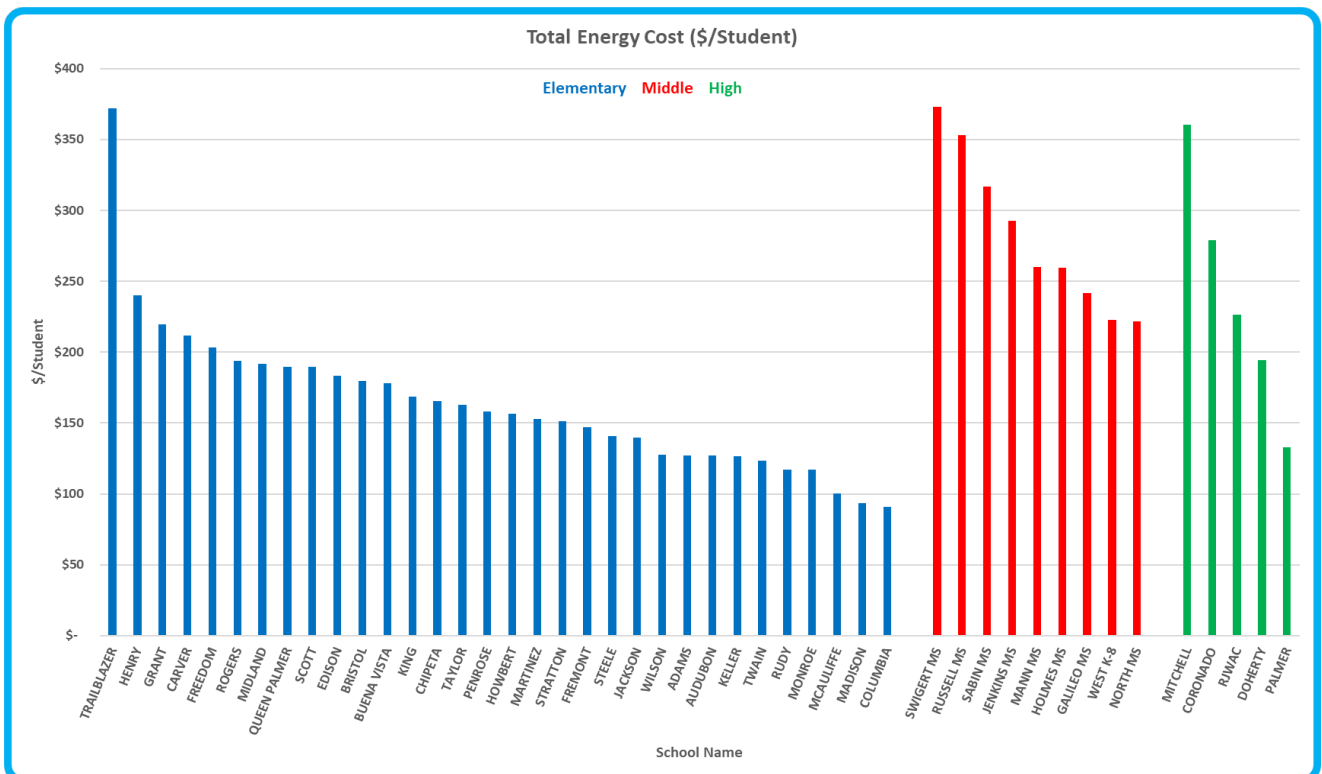
## School-Specific Energy Metrics

The charts below show a representation of how each school compares to others as a part of the whole District utility portfolio.

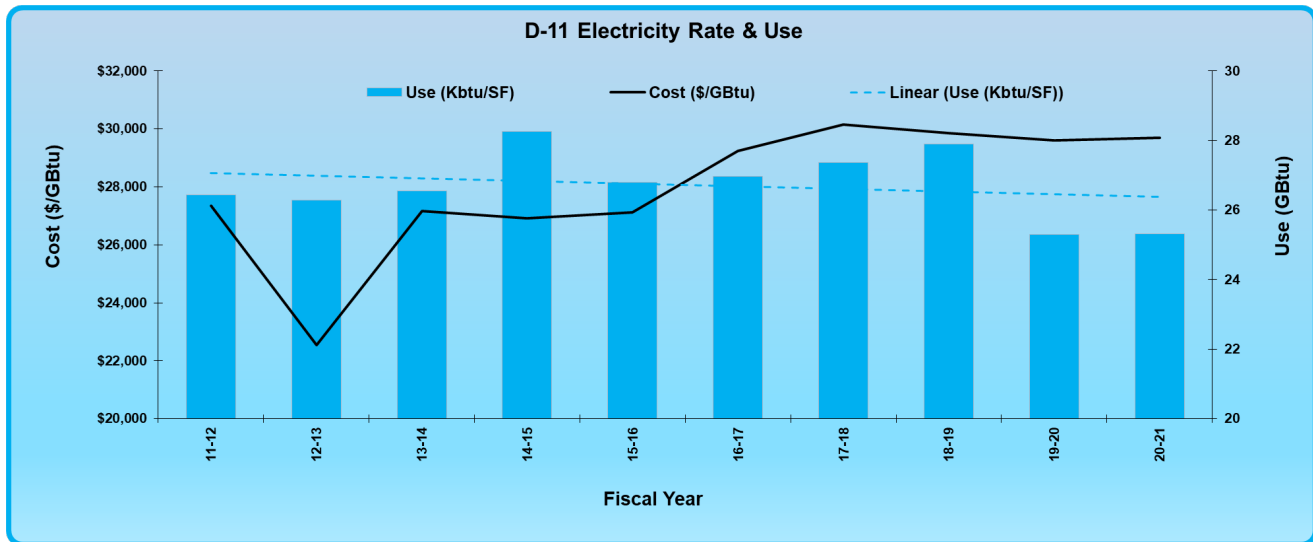
*The chart below shows the District's annual cost (\$) per square foot (sqft).*



*The chart below shows the District's annual cost (\$) per student.*



## Electricity Rate & Use

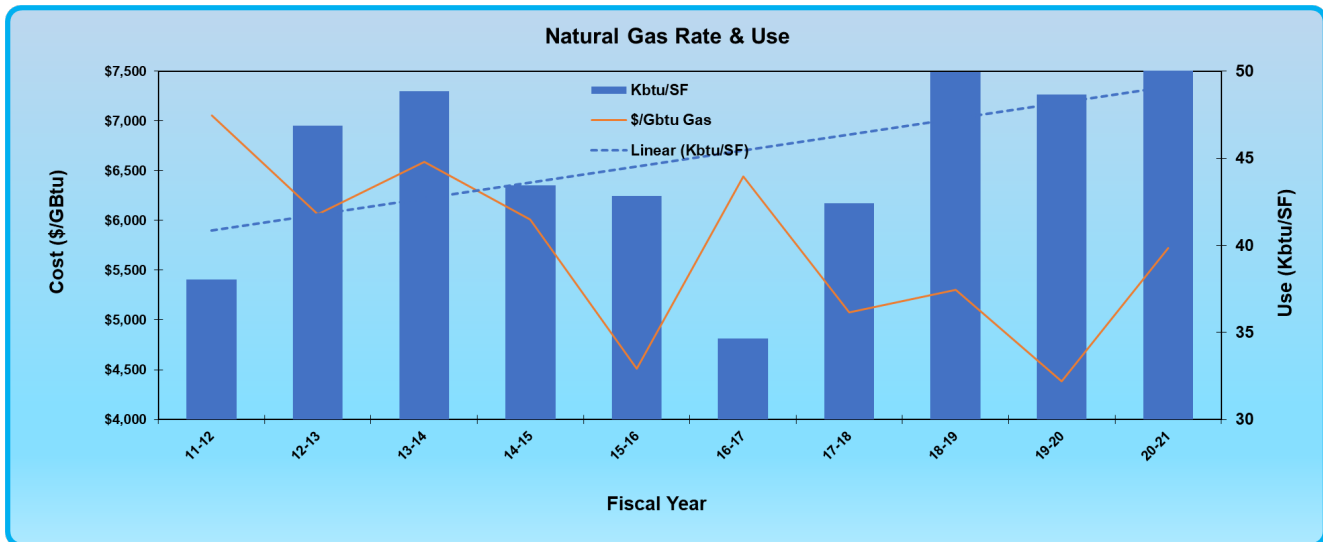


The graph above reflects the price paid for electricity (black line) and the electricity consumed (blue bars) by District 11 during the last ten years.

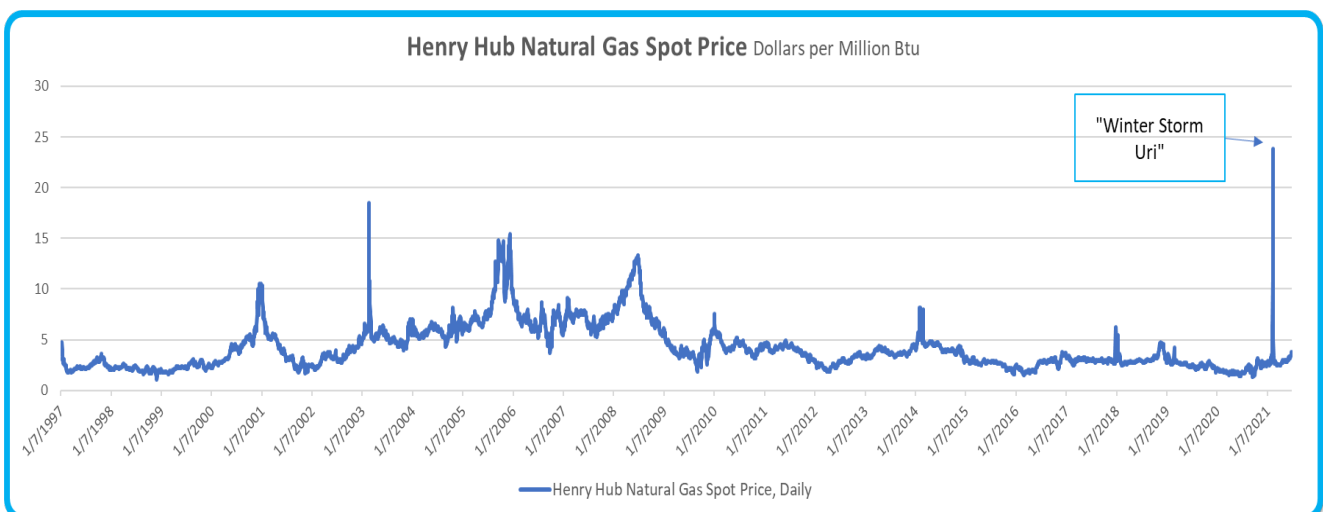
Electricity has long-been our largest utility expense. Although we have experienced a slight increase in our electric rates in the last ten years, we have also been able to maintain a fairly consistent electrical use over the last ten years. It should be noted that throughout the ten-year period represented 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.

In addition to adding air conditioning to several buildings over the last ten years, we have also shed several buildings from our portfolio over those same years: Bates Elementary, Lincoln Elementary, Hunt Elementary, Jefferson Elementary, and Irving Middle School. While each of these locations may not have had air conditioning, the utilities spend has been reduced accordingly.

## Natural Gas Rate & Use



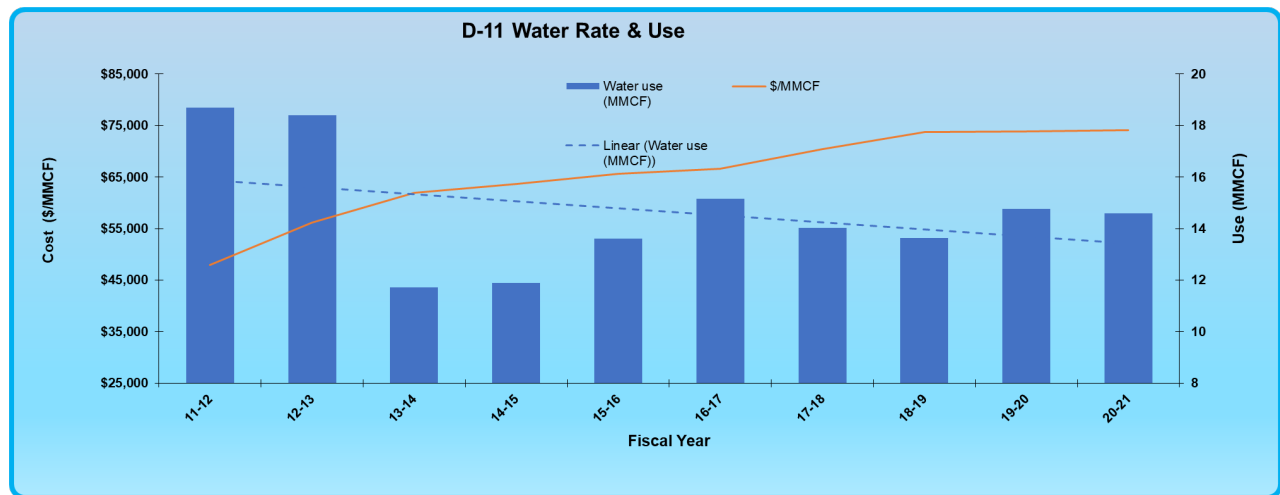
The significant and historical weather event that began on February 12, 2021, Winter Storm Uri, impacted a substantial portion of the continental United States, severely disrupting the supply, transportation, and distribution of natural gas across a multitude of pipeline systems. Colorado Springs Utilities and Symmetry Energy, from whom we purchase our natural gas, were forced to pass on the higher rates for the natural gas. The increased rates resulted in a \$146,000 increase to our natural gas utility bill for the month of February when compared to the average February natural gas spend.



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 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 the careful tracking of the energy consumption of District buildings over the past 20 years, water consumption of our facilities and grounds has been closely monitored. 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 decreased water consumption over the last 10 years alongside the rapidly increasing cost of water during that the same period.

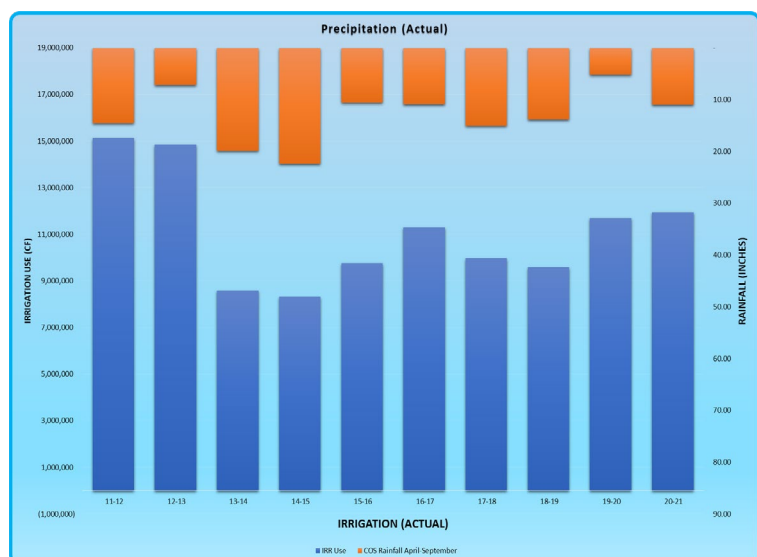


\*Note: MMCF = Million Cubic Feet

As shown on the “Historical Utilities Rates” graph on page 8 of this report, the rate District 11 pays for water has increased by 300% in the last 21 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. During FY 20-21 alone, multiple water leaks were discovered using this method.

In the graph shown to the right, we compare our annual watering season rainfall (orange bars) with irrigation water use (blue). This data further supports the need to monitor and adjust our irrigation schedules to continue to save resources and maintain a positive environment for our students, staff and community.



After recognizing the upward trend of water rates, 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. We are currently evaluating a couple of options available to assist us in moving forward with our plans to minimize the District irrigation expense.

One exciting initiative on the horizon is the potential conversion of all District high school athletic fields from Kentucky Blue Grass to artificial turf. In addition to an aesthetic improvement for each site, this conversion will provide the District with 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 to the District.

## ENERGY SAVINGS HIGHLIGHTS

In addition to managing the \$5 million annual utility budget, Colorado Springs School District 11 Energy and Sustainability Program team either assisted with or implemented the following energy savings projects during the 2020-2021 fiscal year:



**Trailblazer Elementary** - Relamped the interior and exterior with LED - expected savings of \$23,142 / year (photo to the left)

**Edison Elementary School** - Discovered that this site had moved to an electric 'demand rate' class due to faulty HVAC controls. Once HVAC system repairs were complete, we petitioned CSU to revert the property to a 'non-demand' rate class - avoided an additional \$7,500 yearly expense.

**FOTC** - Relamped all exterior lighting, to include the bus parking lot with LED - expected savings of \$6,780 / year

**Garry Berry Stadium** - Relamped the perimeter, storage, and locker room lighting with LED - expected savings of \$2,135 / year

**Carver Elementary School** - Relamped the gymnasium with LED - expected savings of \$258 / year (photo to the right)

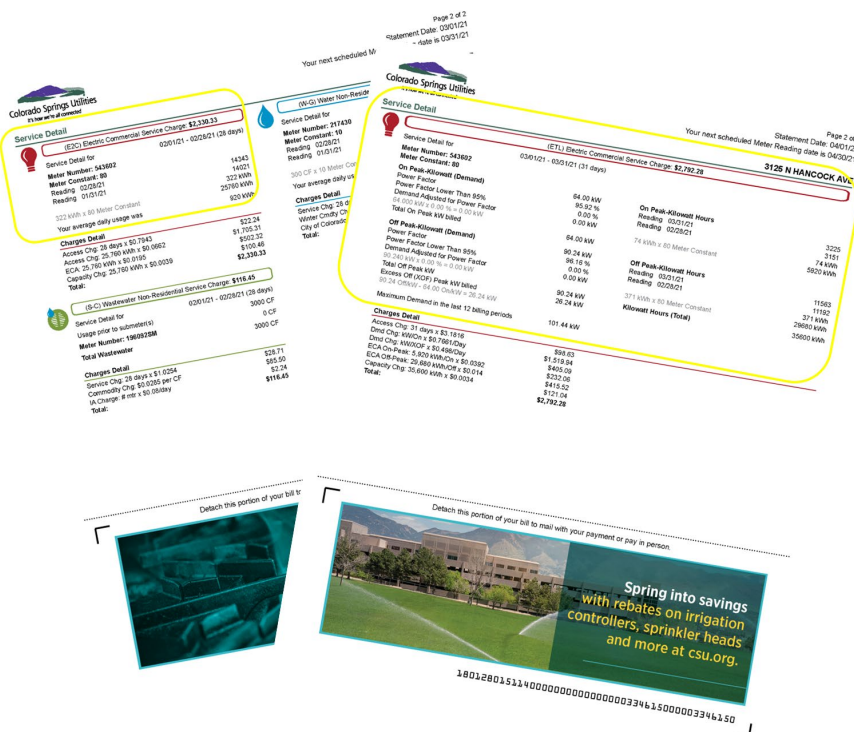




**Coronado High School** - Relamped the courtyard with LED - expected savings of \$1,635 / year).

**Freedom Elementary School** - Relamped the gymnasium with LED - expected savings of \$382 / year (photo to the right)

**Monroe Elementary School** - Relamped the gymnasium with LED - expected savings of \$281 / year



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



## Capital Projects - Energy Savings Highlights

In addition to the above-mentioned projects completed by the energy & sustainability program, the capital program 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)

**Data Center** - Replaced Data Center Computer room air conditioning (CRAC) units with new high efficiency units, along with a new roof top unit (RTU).

**Bristol Elementary** - Replaced all roof top units (RTU) that have a higher EER, thus saving the district energy dollars, along with new high efficiency motors on all return fans. (photo to the right)



## Renew Our Schools

This last Spring, eleven (11) District 11 schools participated in a [Renew Our Schools Energy Competition](#).

The purpose of this competition is to empower our students to conserve energy through exciting and engaging hands on project-based learning. The Renew Our Schools program includes five weeks of energy conservation curriculum that gets students and staff in our schools excited about responsible energy use. Our schools use real-time energy gauges to monitor electricity use and see the immediate impact of making energy-savings changes. The students had to meet specific metrics such as: learning to use different energy monitoring tools, using and interpreting the data from an eGauge, designing an energy savings poster, completing an in-school energy audit, and completing a home energy audit as well. D11 partnered with Colorado Springs Utilities (CSU) to provide the participating students with a Home Energy Efficiency kit that included 2 LED light bulbs, 2 low-flow faucet aerators, 1 low-flow showerhead, and toilet leak detection tablets. Schools that completed all program metrics benefitted from an energy saving project for their school, with funds provided by the Colorado Energy Office and matching funds from the D11 Energy & Sustainability program. Congratulations to those students and staff members who made this happen. Several of the projects listed on page 15 of this report were completed as a result of this program.

**RENEW  
OUR  
SCHOOLS**  
Get smart about  
energy use.

## Rebates

Colorado Spring Utilities provides their customers with rebates and incentives. The District 11 Energy and Sustainability Program team is continually looking to implement projects that would qualify for these rebates to take advantage of projects that would benefit from either energy or water savings.

Over the last year we have received approximately \$10,300 in rebate checks from Colorado Springs Utilities, bringing the total received over the last three years to approximately \$52,000.



## 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 solicitation. 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 (audit) and subsequent improvement of energy inefficient facilities. We hope that this effort will result in a noticeable improvement in the efficiency of the buildings that are audited.
- Lighting upgrades. In addition to completing multiple elementary school gym lighting retrofits, this summer we plan to complete a site-wide interior and exterior LED lighting retrofit at one school (location to be determined).
- 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.
- Installation of real-time electricity meters at ten sites. The installation of these “Egauge” meters will provide us with real-time data showing electrical use at each monitored site at any given time. The data is then stored and available to view for 30 years.
- Capacitor bank upgrades. A recent audit of our utility bills showed that we have several schools that are currently assessed “power factor” fees each month. In order to eliminate these fees, we are working with a local electrical engineer to assess the electrical systems within these facilities and make recommendations to remedy the power factor fees.

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!