DENTON INDEPENDENT SCHOOL DISTRICT

TDIndustries

ANNUAL UTILITY REPORT – JULY 2020 TO JUNE 2021

Paul Andress – Executive Director of Operations – DISD

Angela Alfonso – Utility Specialist – DISD

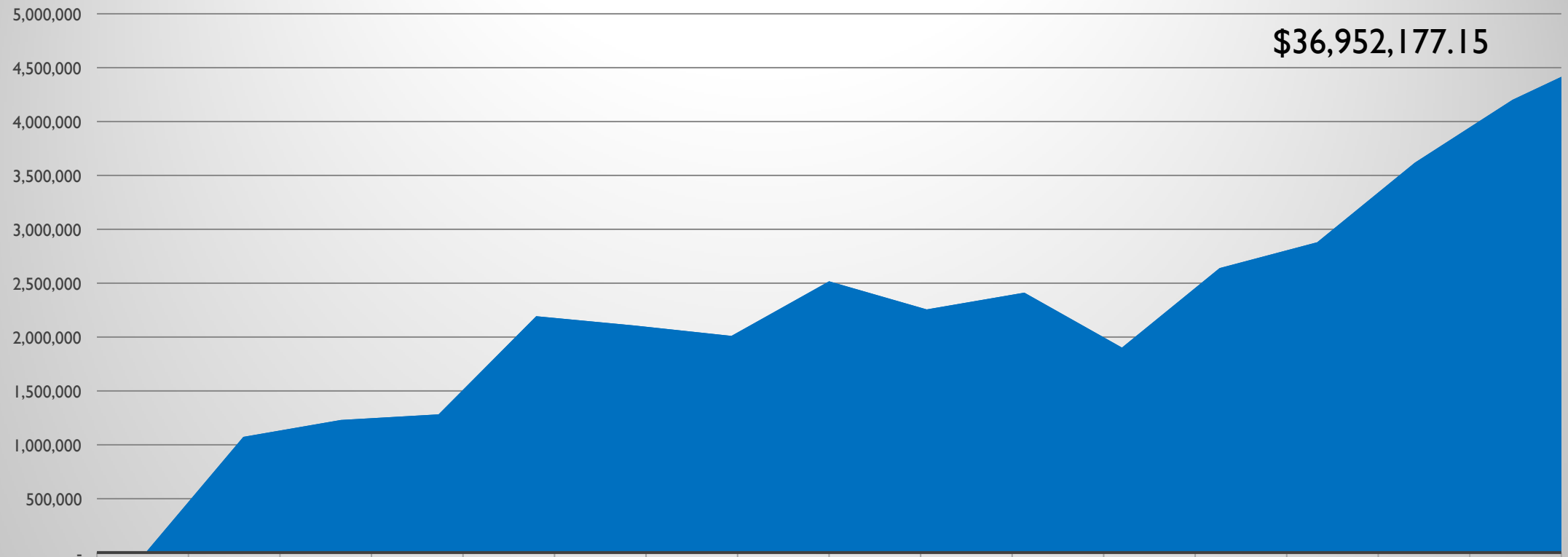
Arnoldo Villarreal – Project Manager – TD

Brian Lillard – Vice President - TD

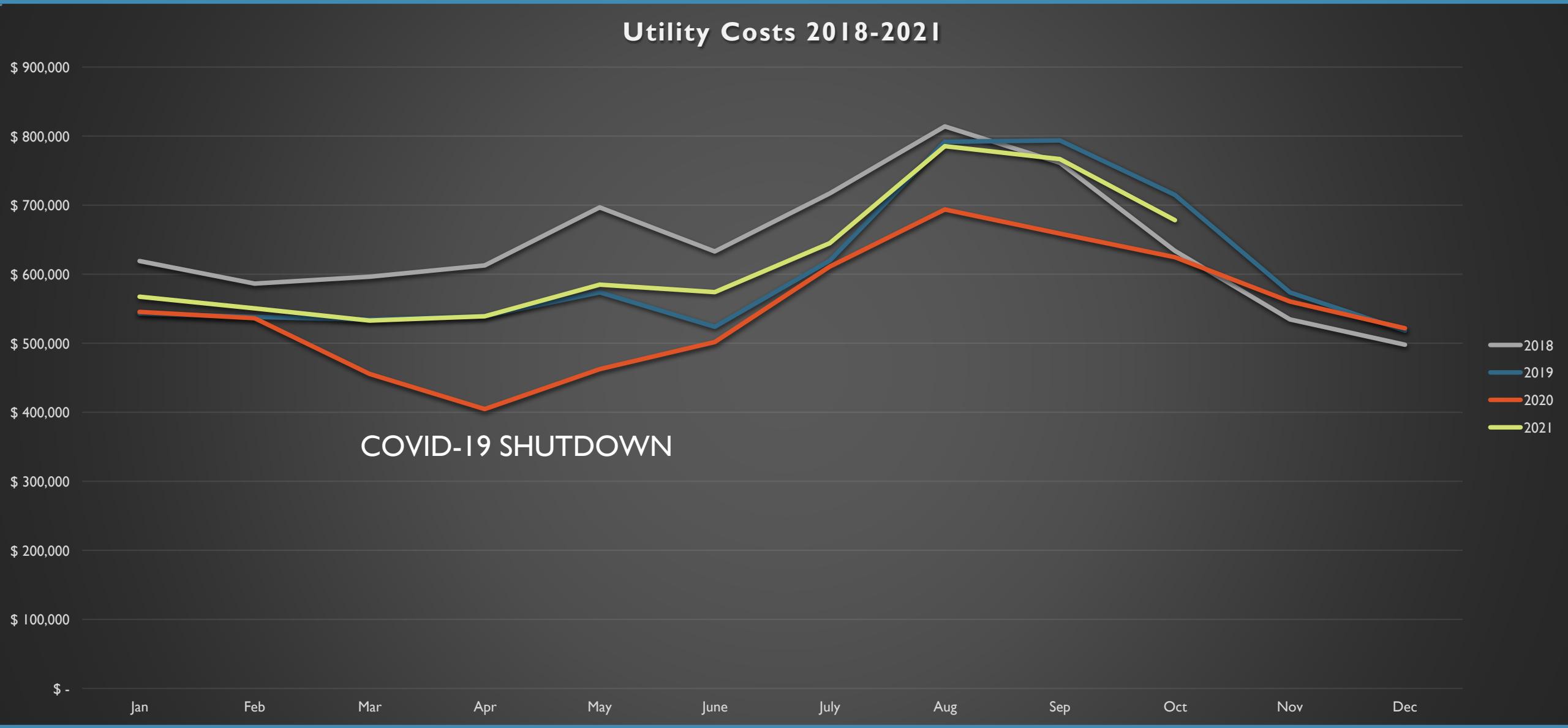
Brandon Hoke, P.E. – Engineering - TD

Utility Performance Trends

UTILITY SAVINGS OVER TIME - FY 2021 UPDATE



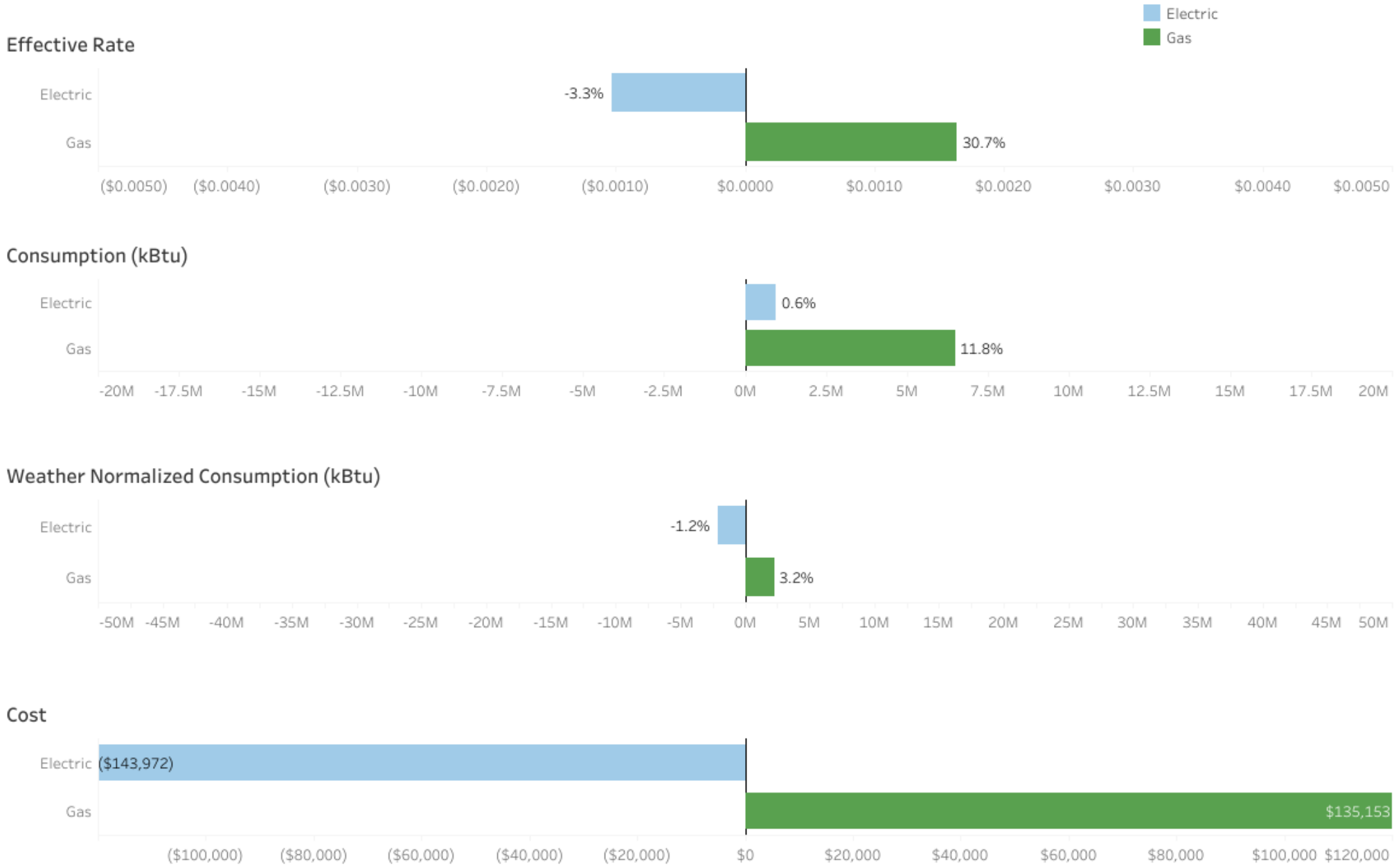
	FY 05/06	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21
SQUARE FEET	3,553,417	3,916,124	3,996,458	4,318,052	4,499,603	4,648,225	4,660,667	4,761,856	4,943,330	5,032,004	5,032,004	5,619,746	5,817,287	5,957,294	6,044,296	6,375,731
$/SF	$ 1.96	$ 1.68	$ 1.65	$ 1.66	$ 1.47	$ 1.50	$ 1.53	$ 1.43	$ 1.50	$ 1.48	$ 1.58	$ 1.49	$ 1.46	$ 1.35	$ 1.26	$ 1.23
SAVINGS	$ -	$ 1,073,501.5	$ 1,230,354.2	$ 1,282,368.1	$ 2,193,254.1	$ 2,107,592.6	$ 2,010,617.9	$ 2,517,251.3	$ 2,256,363.5	$ 2,411,913.8	$ 1,902,017.5	$ 2,639,727.3	$ 2,879,609.4	$ 3,618,207.9	$ 4,201,357.4	$ 4,628,039.95


Utility Costs 2018-2021
$ 900,000
$ 800,000
$ 700,000
$ 600,000
$ 500,000
$ 400,000
$ 300,000
$ 200,000
$ 100,000
$ -
Jan
Feb
Mar
Apr
May
June
July
Aug
Sep
Oct
Nov
Dec
2018
2019
2020
2021
COVID-19 SHUTDOWN

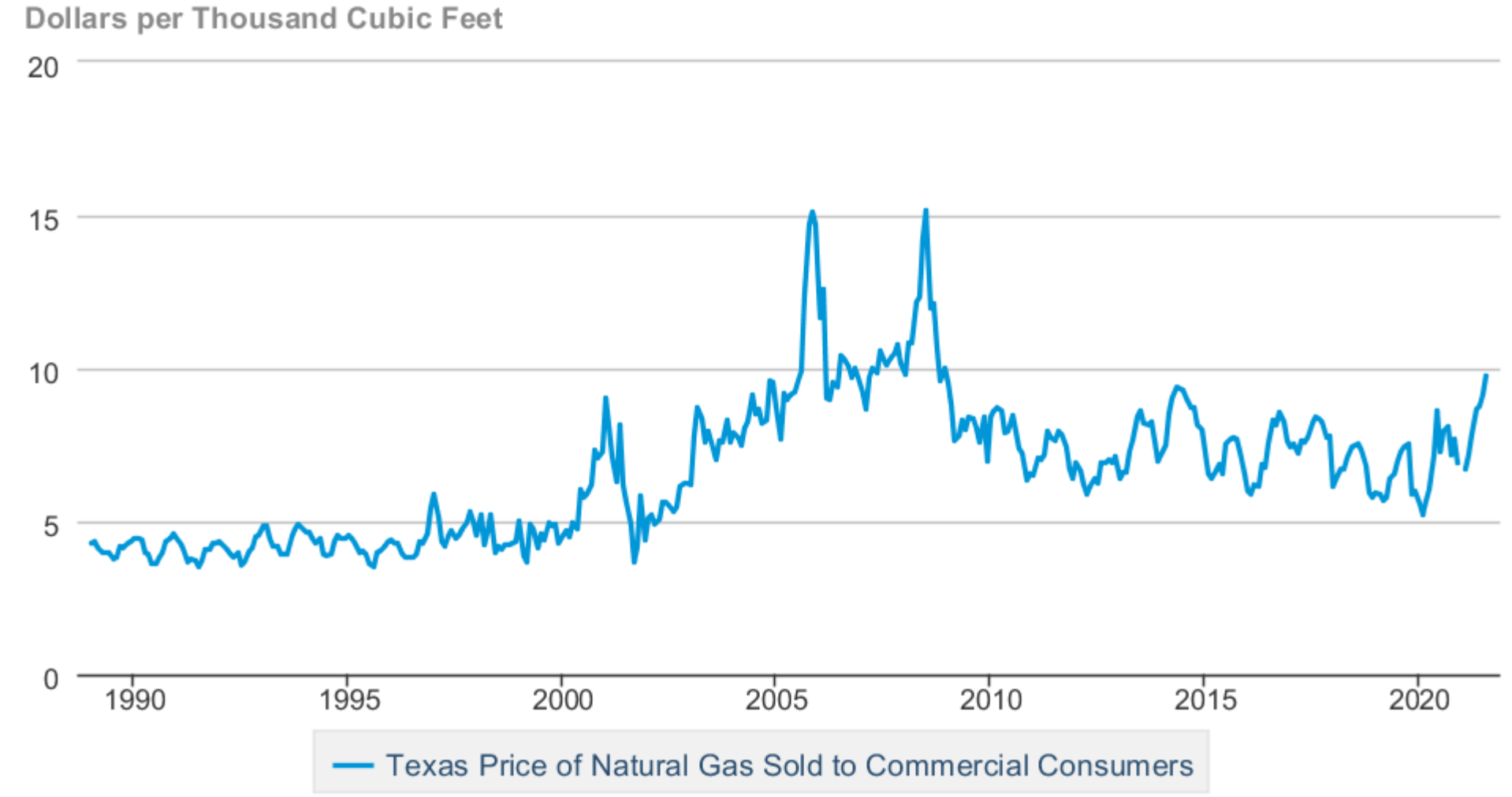
2 Years ago | Previous Year | Current Year

	July 2019 - June 2020	July 2020 - June 2021	% Change	Cost Change ($)
Electric	$5,305,403	$5,161,431	-3%	($143,972)
Gas	$292,787	$427,940	46%	$135,153
Irrigation Water	$504,377	$514,608	2%	$10,231
Potable, Sewer & Storm Water	$816,889	$914,727	12%	$97,839
Refuse	$744,568	$836,834	12%	$92,266
Total	**$7,664,022**	**$7,855,540**	**2.50%**	**$191,518**

All Schools Energy Performance Change Compared To Last Year

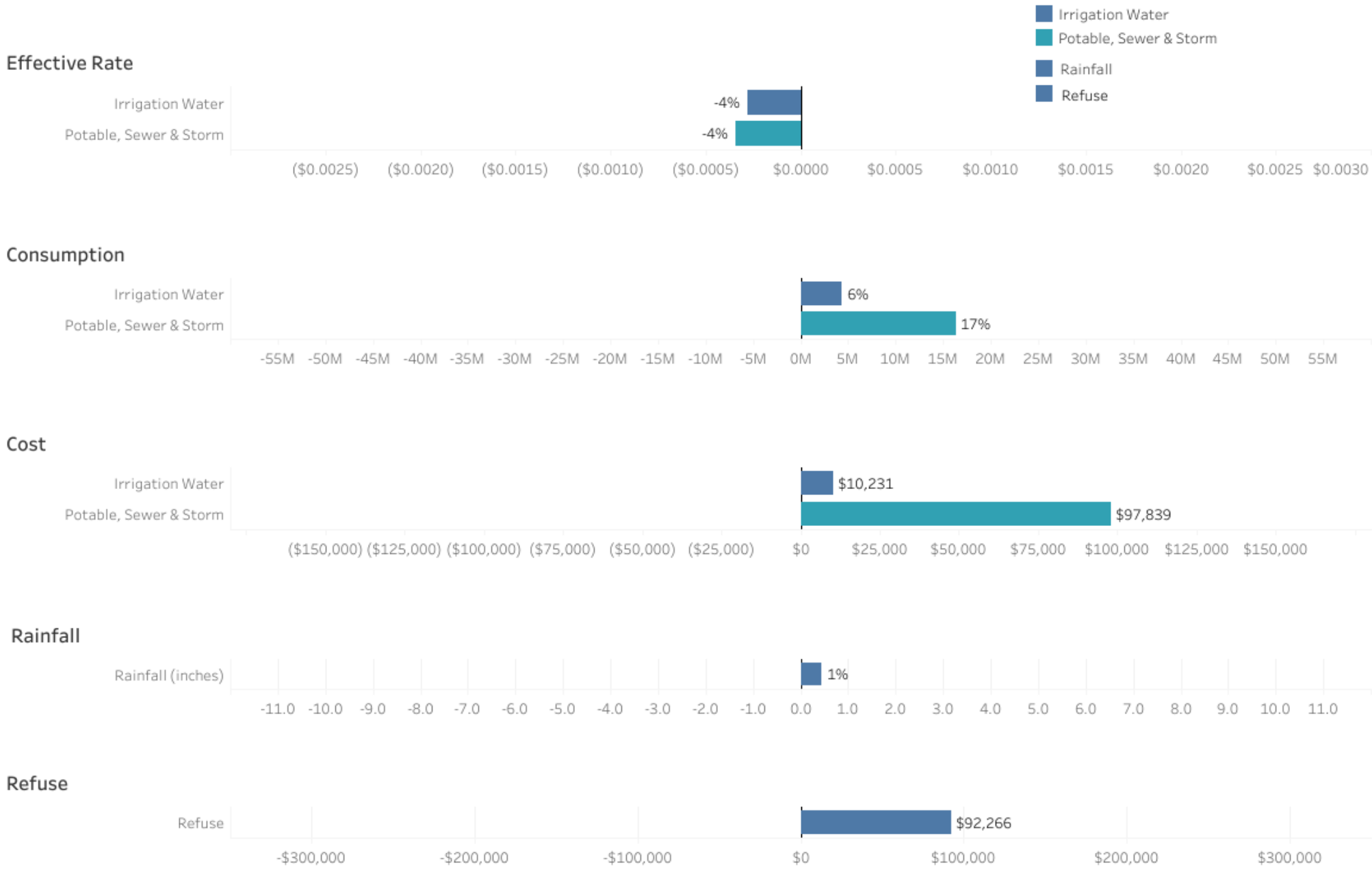


Texas Price of Natural Gas Sold to Commercial Consumers



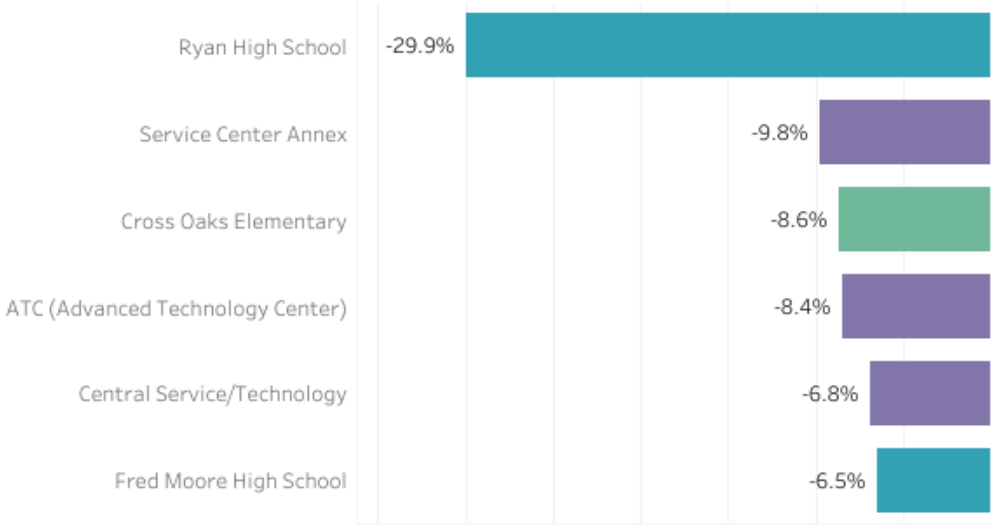
eia Source: U.S. Energy Information Administration

Water and Refuse Performance Change Compared To Last Year



Electric - Top Performers

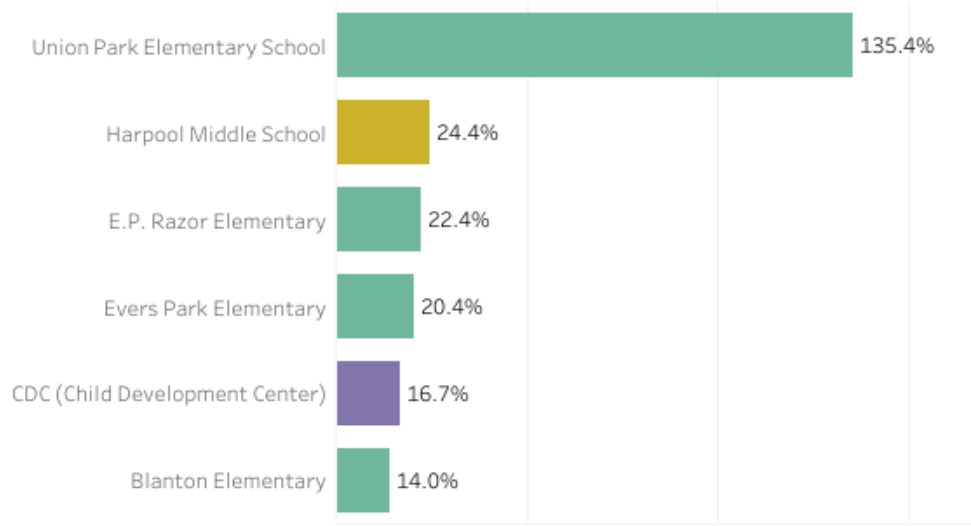
Largest % Decrease in Usage



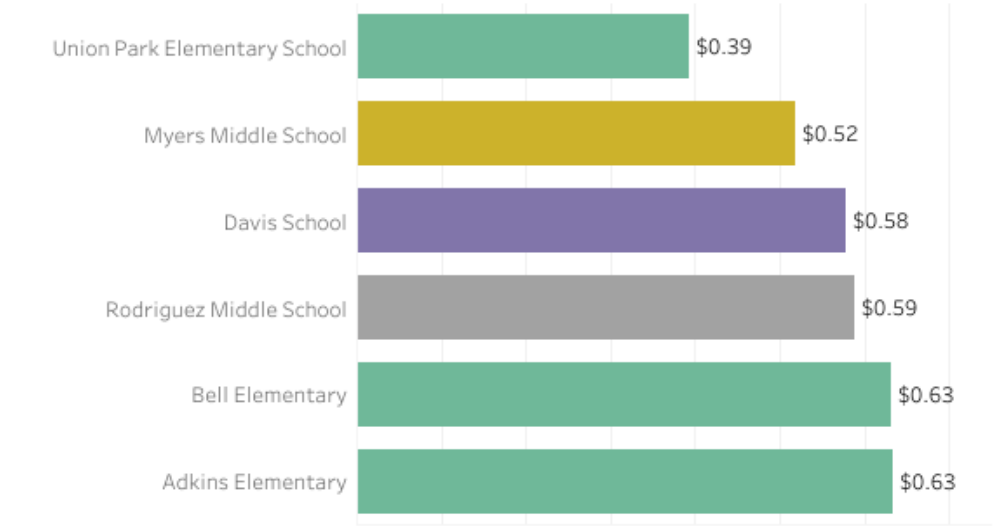
Opportunities

Auxiliary
Elementary Schools
Middle Schools
High Schools

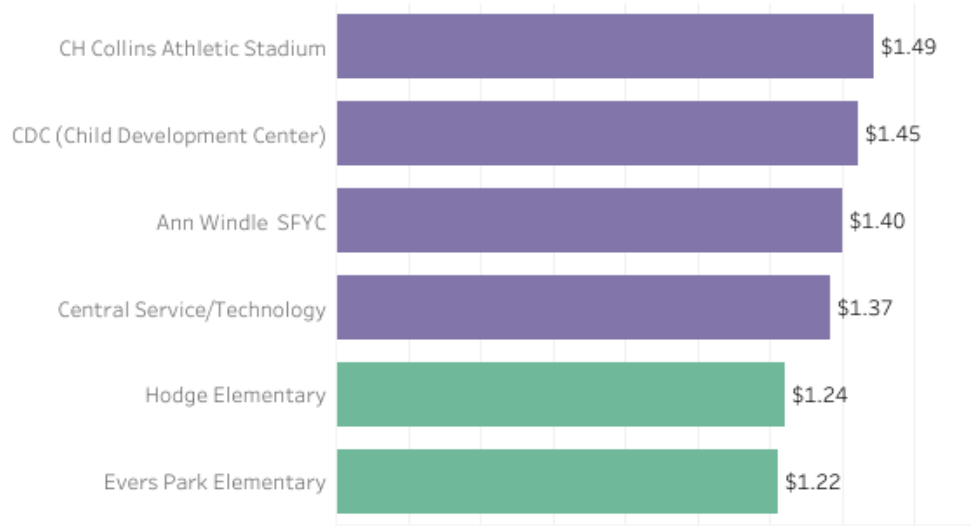
Highest % Increase in Usage



Lowest Cost per SqFt



Highest Cost per SqFt



UNION PARK SOLAR UPDATE

Power Grid

Solar Power

Solar Panels

Solar Meter

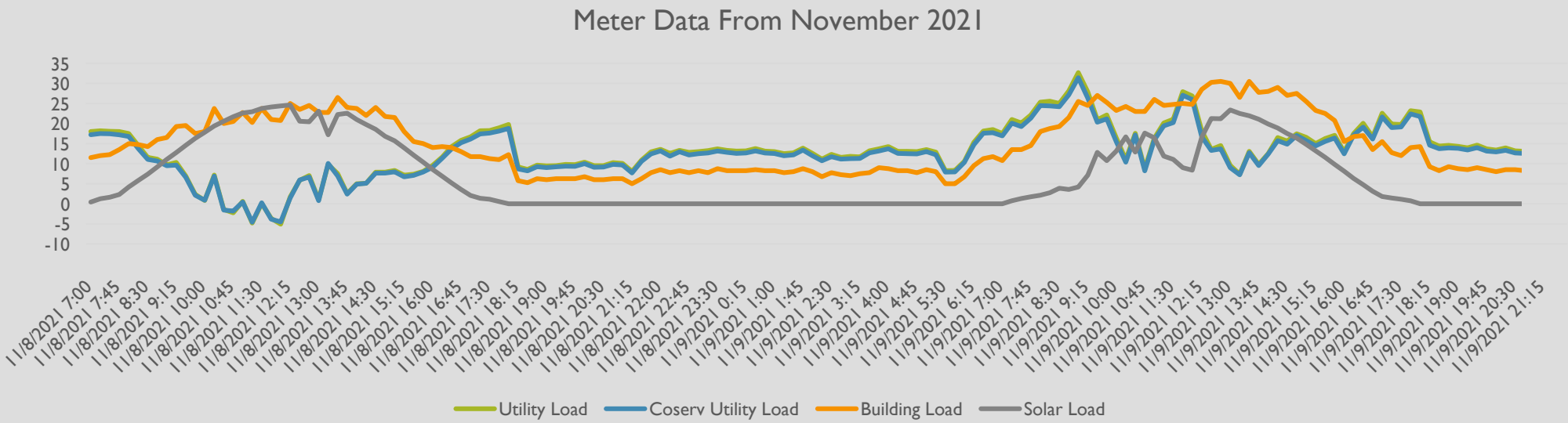
Coserv Utility Meter

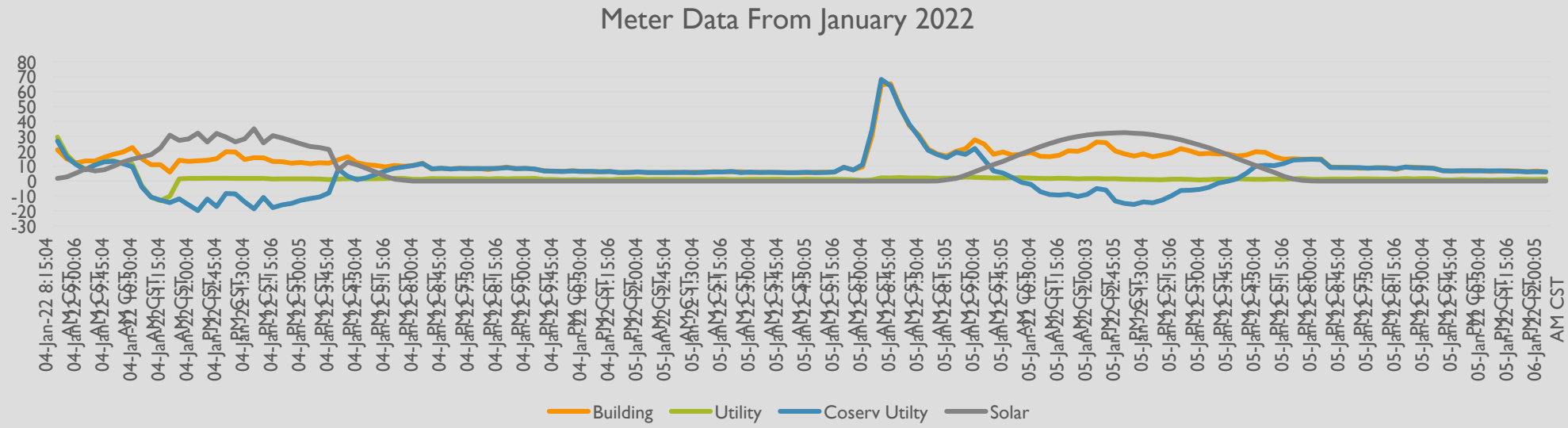
Utility Meter

Building Meter

Union Park Elementary

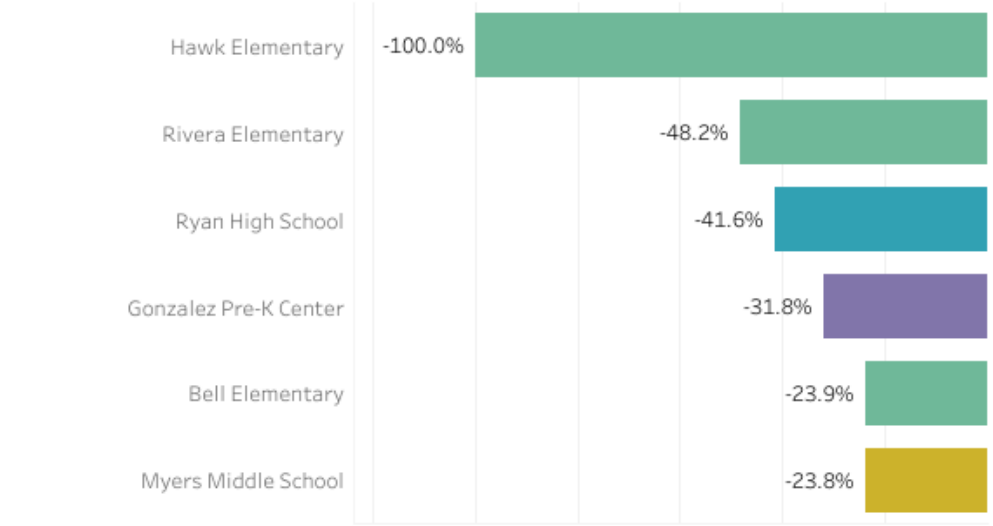
UNION PARK SOLAR



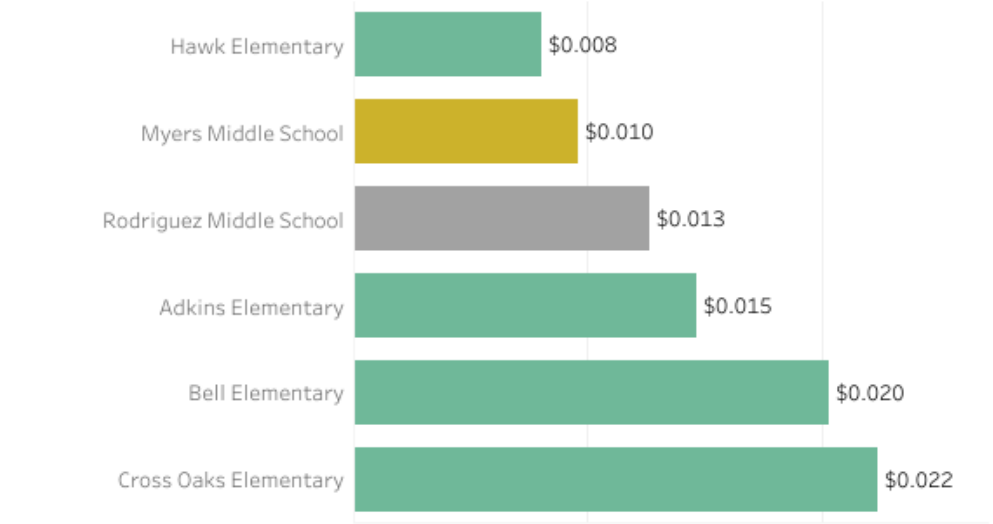


Gas - Top Performers

Largest % Decrease in Usage



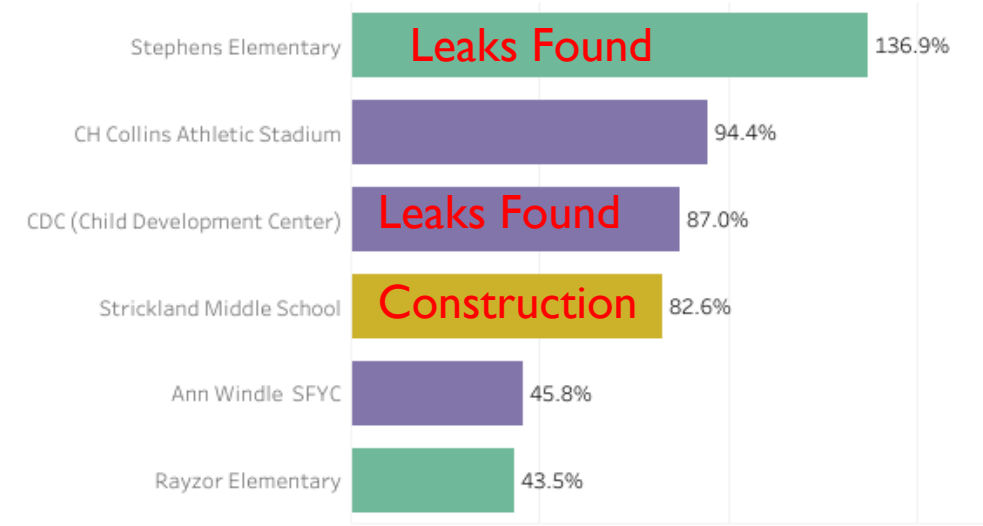
Lowest Cost per SqFt



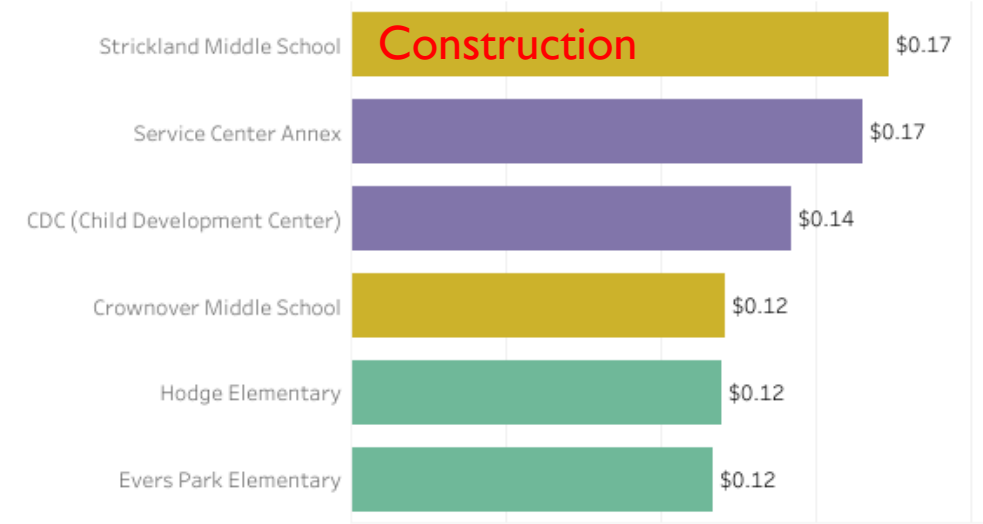
Opportunities

Auxiliary
Elementary Schools
Middle Schools
High Schools

Highest % Increase in Usage

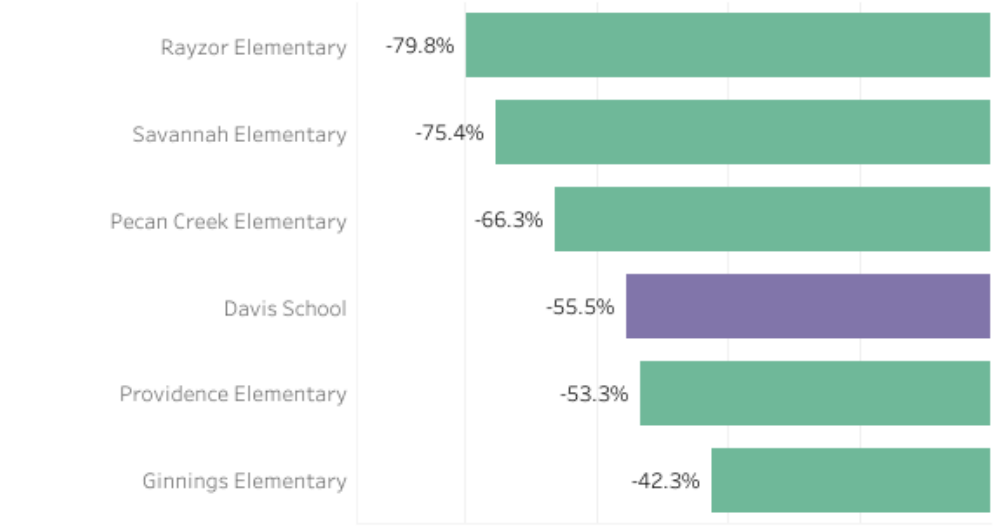


Highest Cost per SqFt

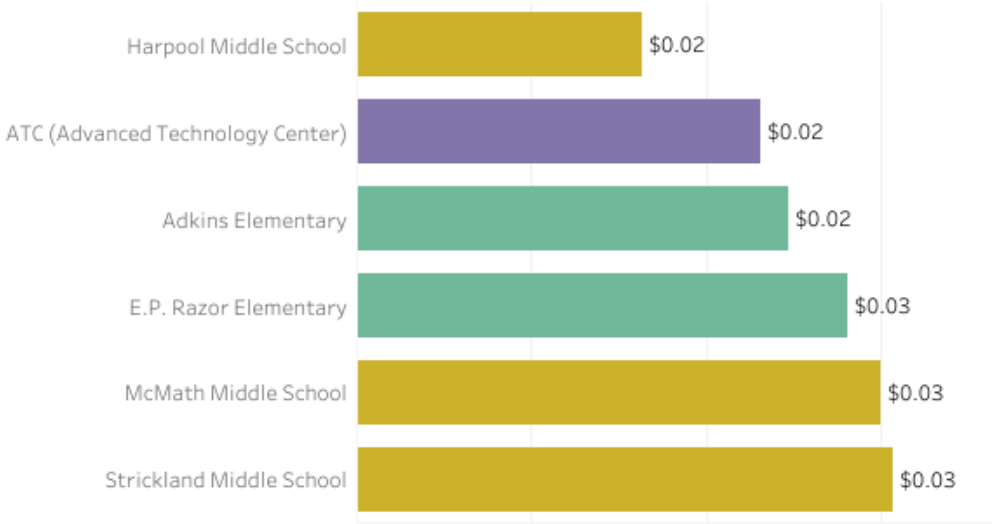


Potable Water - Top Performers

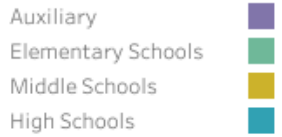
Largest % Decrease in Usage



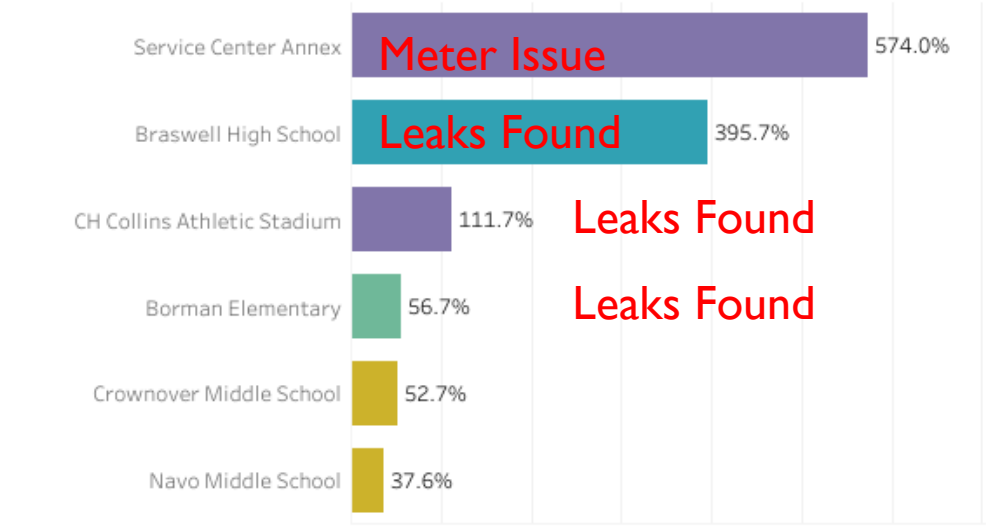
Lowest Cost per SqFt



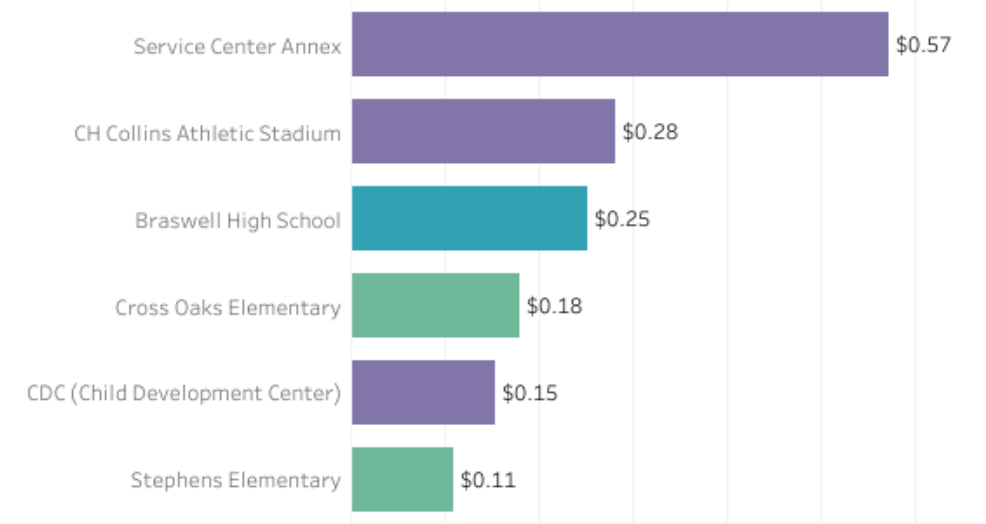
Opportunities



Highest % Increase in Usage

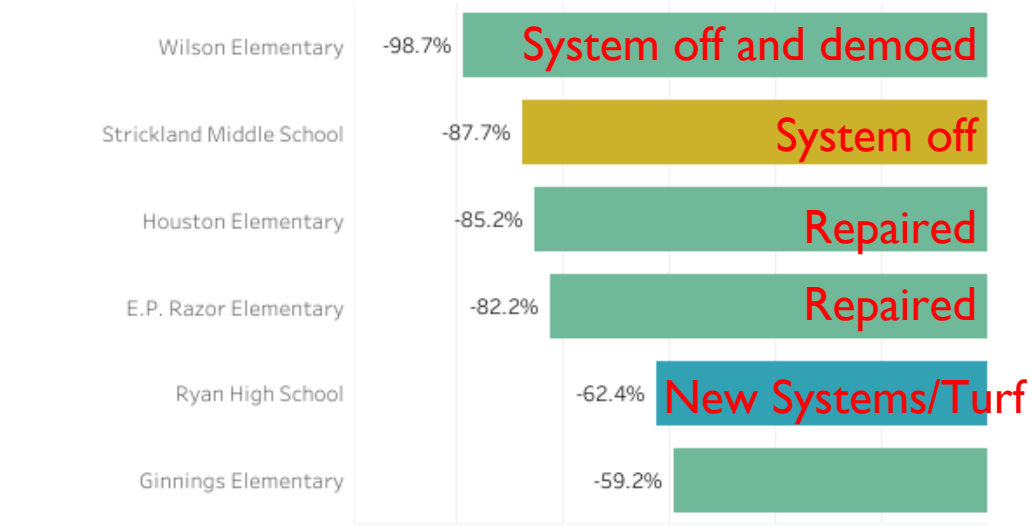


Highest Cost per SqFt

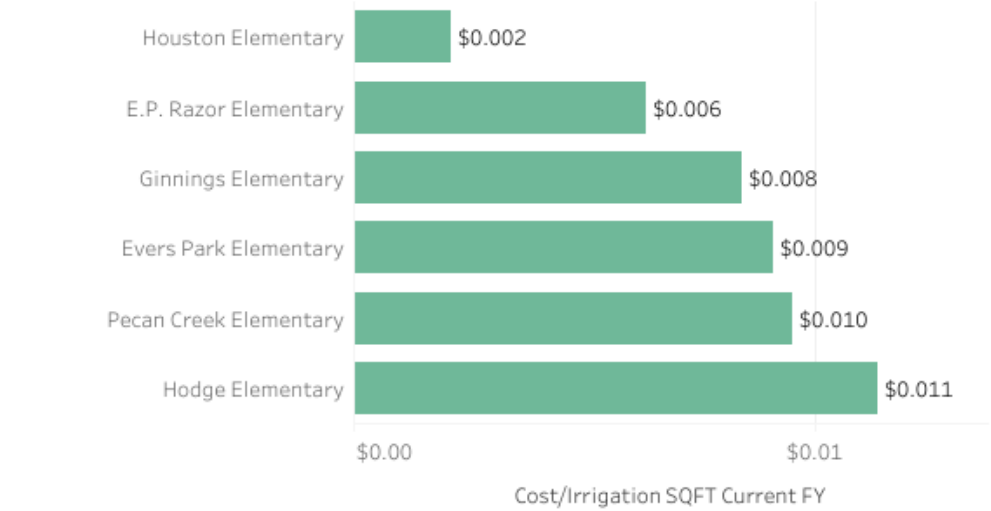


Irrigation Water - Top Performers

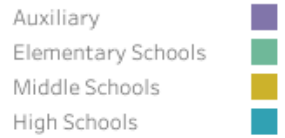
Largest % Decrease in Usage



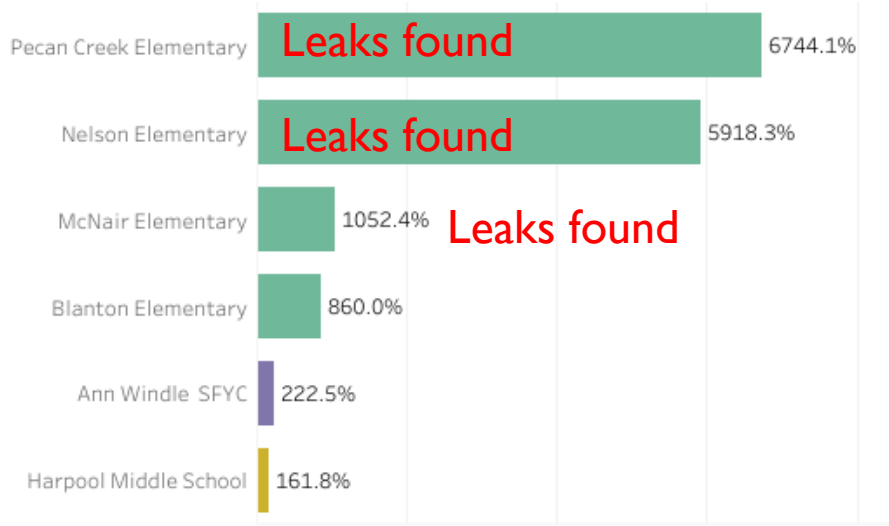
Lowest Cost per SqFt



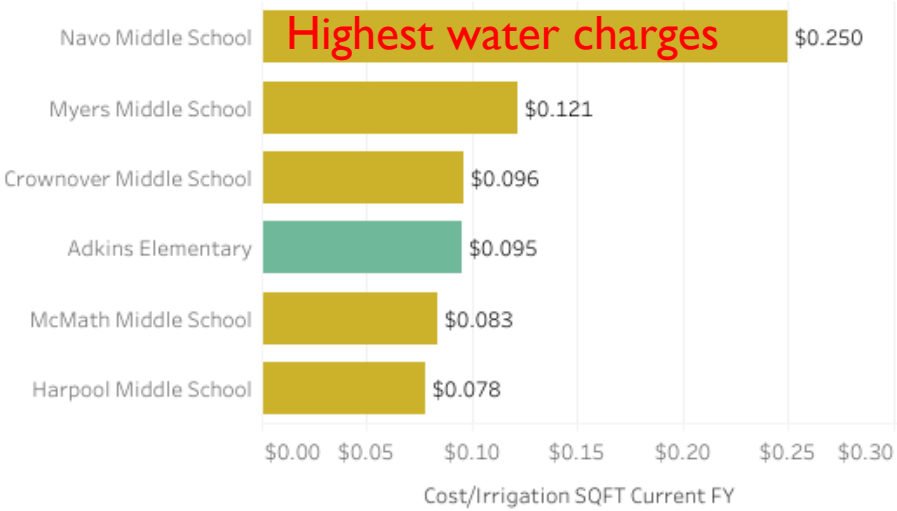
Opportunities



Highest % Increase in Usage



Highest Cost per SqFt



RECENT ACCOMPLISHMENTS

1. Bi-weekly utility audits have continued to find items as outlined in report.
    1. Items Identified: 64
    2. Items Requiring Repair: 20

2. Multiple facilities have had mechanical and controls upgrades completed per the 2018 bond referendum. The new equipment and controls are more energy efficient.

LOOKING AHEAD

1. Evaluating indoor air quality upgrades throughout the district.
2. Implementing solar power at Shultz and reporting out the results.
3. Resolving the solar data issues at Union Park and reporting out the results.
4. Evaluate solar panel data on Sandbrock Ranch Elementary.

INDOOR AIR QUALITY (IAQ) OVERVIEW

ASHRAE – AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS

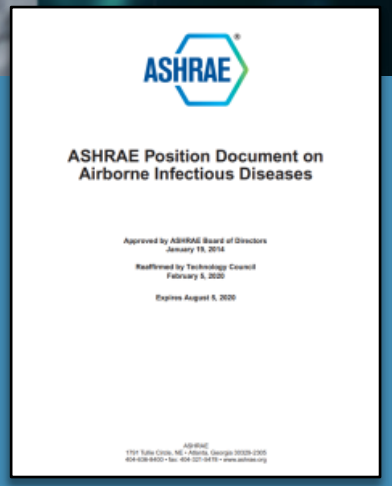
ASHRAE Shaping Tomorrow's Built Environment Today

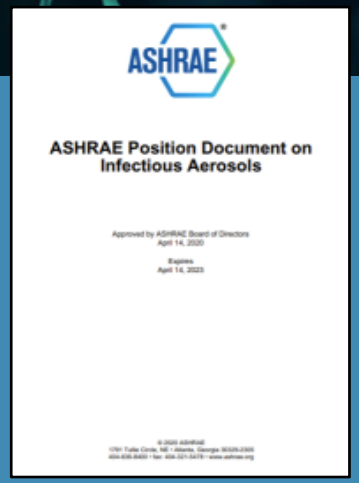
What Are You Looking For?

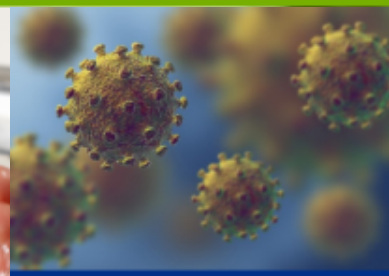
JOIN VOLUNTEER MAKE A GIFT BOOKSTORE LOG IN

ABOUT TECHNICAL RESOURCES PROFESSIONAL DEVELOPMENT CONFERENCES COMMUNITIES MEMBERSHIP

Home › Technical Resources ›





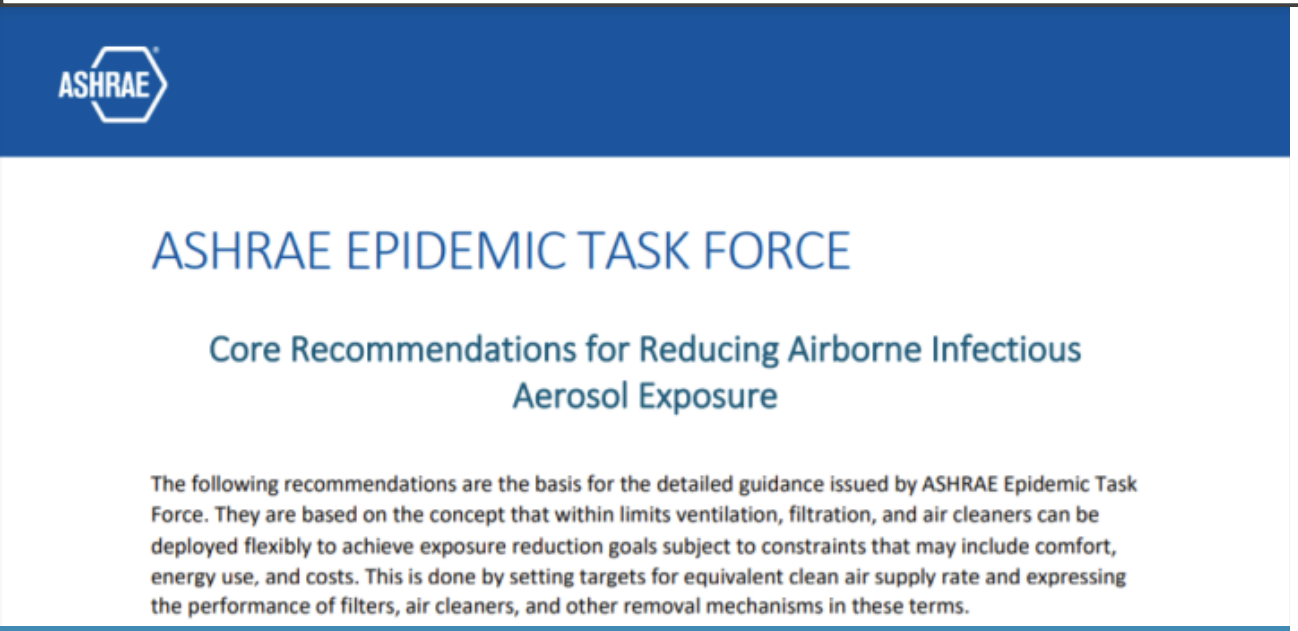


ASHRAE has developed proactive guidance to help address COVID-19 concerns with respect to the operation and maintenance of heating, ventilating and air-conditioning systems. Visit ashrae.org/COVID19 to access these resources from ASHRAE to building industry professionals.

28 days ago

ASHRAE
@ASHRAE

ASHRAE EPIDEMIC TASK FORCE



ASHRAE EPIDEMIC TASK FORCE

Core Recommendations for Reducing Airborne Infectious Aerosol Exposure

The following recommendations are the basis for the detailed guidance issued by ASHRAE Epidemic Task Force. They are based on the concept that within limits ventilation, filtration, and air cleaners can be deployed flexibly to achieve exposure reduction goals subject to constraints that may include comfort, energy use, and costs. This is done by setting targets for equivalent clean air supply rate and expressing the performance of filters, air cleaners, and other removal mechanisms in these terms.

1. *1. Public Health Guidance* – Follow all current regulatory and statutory requirements and recommendations, including vaccination, wearing of masks and other personal protective equipment, social distancing, administrative measures, circulation of occupants, hygiene, and sanitation.

2. *Ventilation, Filtration, Air Cleaning*
   - 2.1 Provide and maintain at least required minimum outdoor airflow rates for ventilation as specified by applicable codes and standards.
   - 2.2 Use combinations of filters and air cleaners that achieve MERV 13 or better levels of performance for air recirculated by HVAC systems.
   - 2.3 Only use air cleaners for which evidence of effectiveness and safety is clear.
   - 2.4 Select control options, including standalone filters and air cleaners, that provide desired exposure reduction while minimizing associated energy penalties.

3. *Air Distribution* - Where directional airflow is not specifically required, or not recommended as the result of a risk assessment, promote mixing of space air without causing strong air currents that increase direct transmission from person-to-person.

4. *HVAC System Operation*
   - 4.1 Maintain temperature and humidity design set points.
   - 4.2 Maintain equivalent clean air supply required for design occupancy whenever anyone is present in the space served by a system.
   - 4.3 When necessary to flush spaces between occupied periods, operate systems for a time required to achieve three air changes of equivalent clean air supply.
   - 4.4 Limit re-entry of contaminated air that may re-enter the building from energy recovery devices, outdoor air, and other sources to acceptable levels.

5. *System Commissioning – Verify that HVAC systems are functioning as designed.*

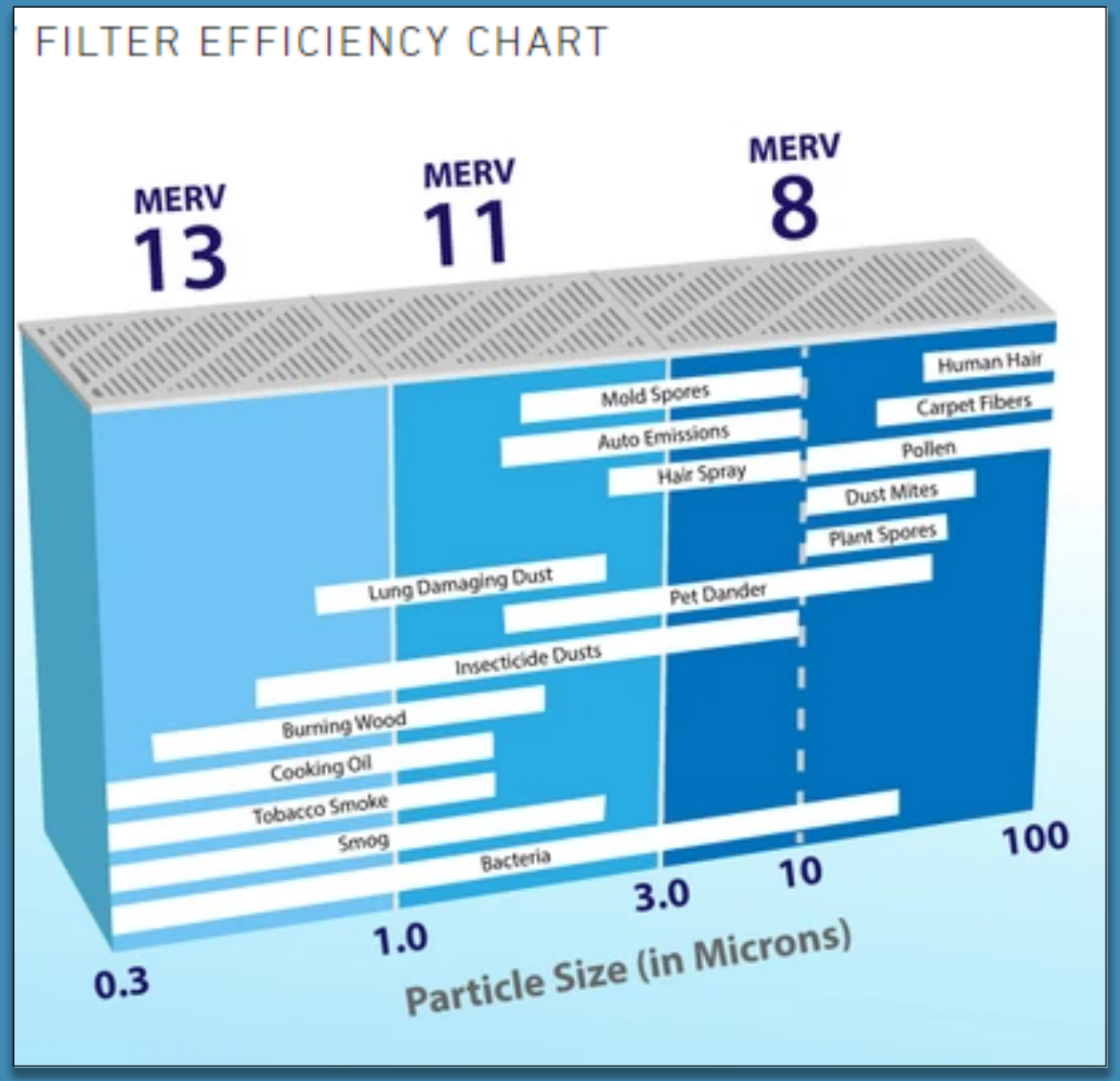
FILTERS AT DENTON ISD

Denton ISD (the "District") has been proactive with implementing filter MERV ratings that go beyond the code minimum MERV 8 for schools and for several years, the District has standardized around the MERV 11 filter rating. While ASHRAE guidelines seem to indicate that higher MERV ratings may have additional benefits against airborne particles, those guidelines caution against exceeding the manufacturer's recommended MERV rating in order to keep the equipment operating effectively. The pressure drop associated with MERV 13 or higher filters that exceeds the system's capabilities may negatively impact air quality by reducing airflow / air change rates, which in turn, reduce outdoor intake volumes and ultimately affect temperate and humidity in the conditioned space. These are all critical factors in mitigating the risk of airborne disease transmission. TDIndustries (TD), in consultation with the District's primary engineering firm, believe that MERV 11 is the highest rated filter suitable for use in the majority of the District's HVAC systems to avoid the risk of adverse, unintended consequences.

From Letter on filtration to Denton ISD from TDIndustries and RWB in 2020

MECHANICAL FILTERS

- MERV 8
  - Minimum required per ASHRAE 62.1
  - Widely used
- MERV13
  - Not required, not widely used
- HEPA
  - Used in hospitals



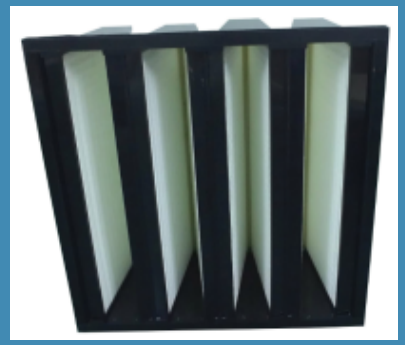
MECHANICAL FILTERS

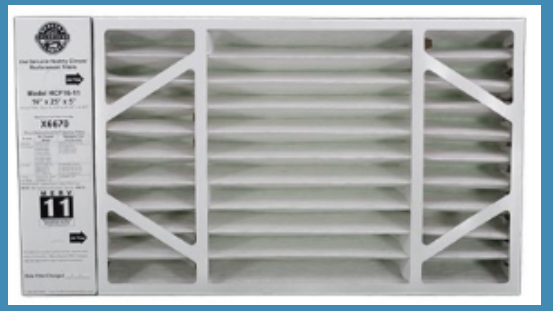
Pros

- Significantly reduce concentrations of indoor particles
- Protects cooling coils when downstream
- Relatively low initial and maintenance costs

Cons

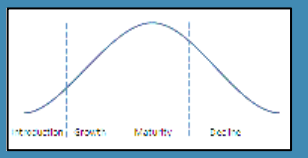
- Only treats air that passes through the Air Handler
- Retrofit has constructability issues due to pressure drop





✓ ASHRAE Strategy

✓ 
Strong Evidence

✓ 
Mature Product

✗ 
Direct Space Benefits

VENTILATION AND AIR CLEANING

Ventilation

- All systems at Denton ISD are designed for the code required outside air or greater

Air Cleaning

- Along with ventilation and filtration, Denton ISD has also incorporated the following to improve indoor air quality throughout the district:
  - Modulating Outside Air Dampers to allow more outside air when the outdoor conditions are right.
  - Bi-Polar Ionization
  - Bi-Annual Coil Cleaning and sanitization
  - Bi-Annual filter changes to maintain clean systems.

THE END