

**EVERSOURCE**

**Energy  
Excellence  
Award**

**2023**



Winning Category

# **NEW CONSTRUCTION**

**Design of the Year**  
Acton-Boxborough RSD  
Boardwalk Campus

The 2023 Energy Excellence Awards recognized Acton-Boxborough Regional School District (ABRSD) and Arrowstreet Architecture & Design for having the winning project for this category. Through their partnership with Eversource and Arrowstreet, ABRSD built a fully all-electric building with a greatly reduced carbon footprint. Its carbon output is 33% less than a typical new school in Massachusetts.

EUI = Energy Use Intensity

kBTU per sq.ft. per year

Yardstick for buildings!

## **Energy Use Intensity (EUI)**

MEASURED FOR 365 DAYS



SPACE HEATING



PUMPS & FANS



SPACE COOLING



LIGHTING



HOT WATER



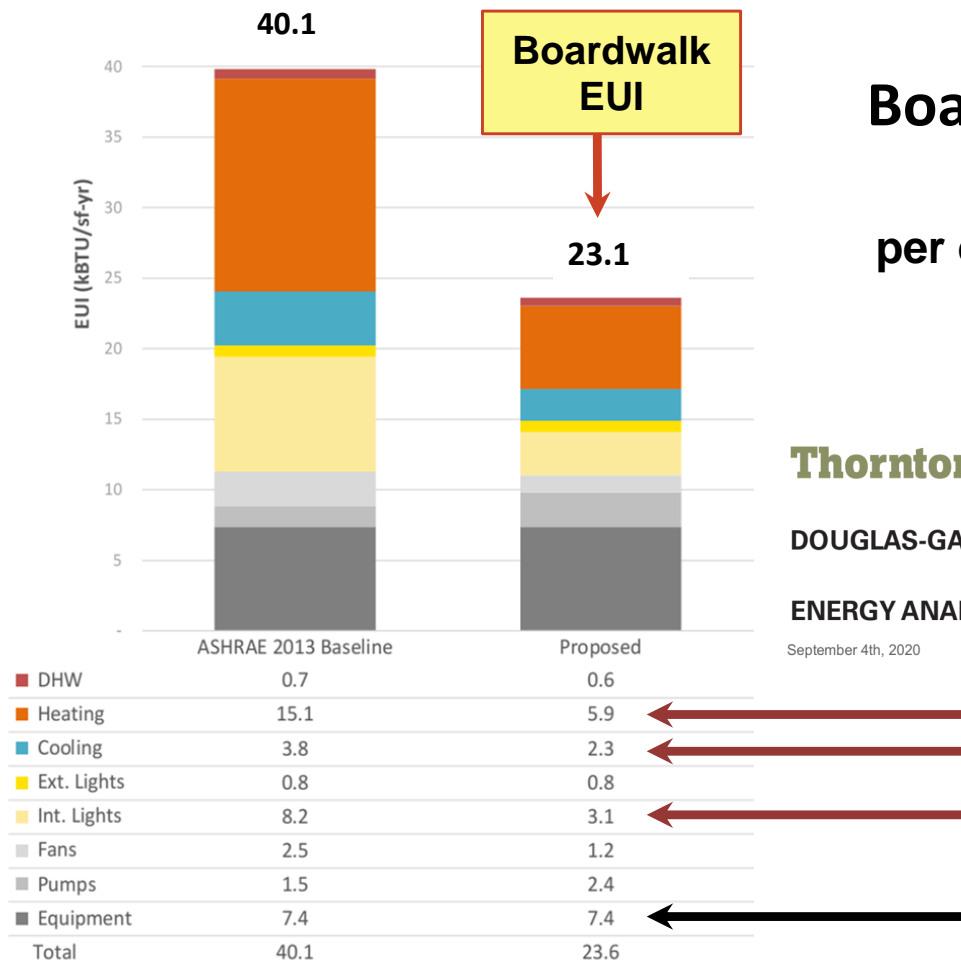
OTHER LOADS



**ENERGY  
CONSUMPTION**

(kBtu / YEAR)

**FLOOR AREA (SQ. FT.)**



**Boardwalk EUI**  
**23.1**  
per energy model

**Thornton Tomasetti**

DOUGLAS-GATES ELEMENTARY SCHOOL

ENERGY ANALYSIS

September 4th, 2020

## Boardwalk: Tight building envelope



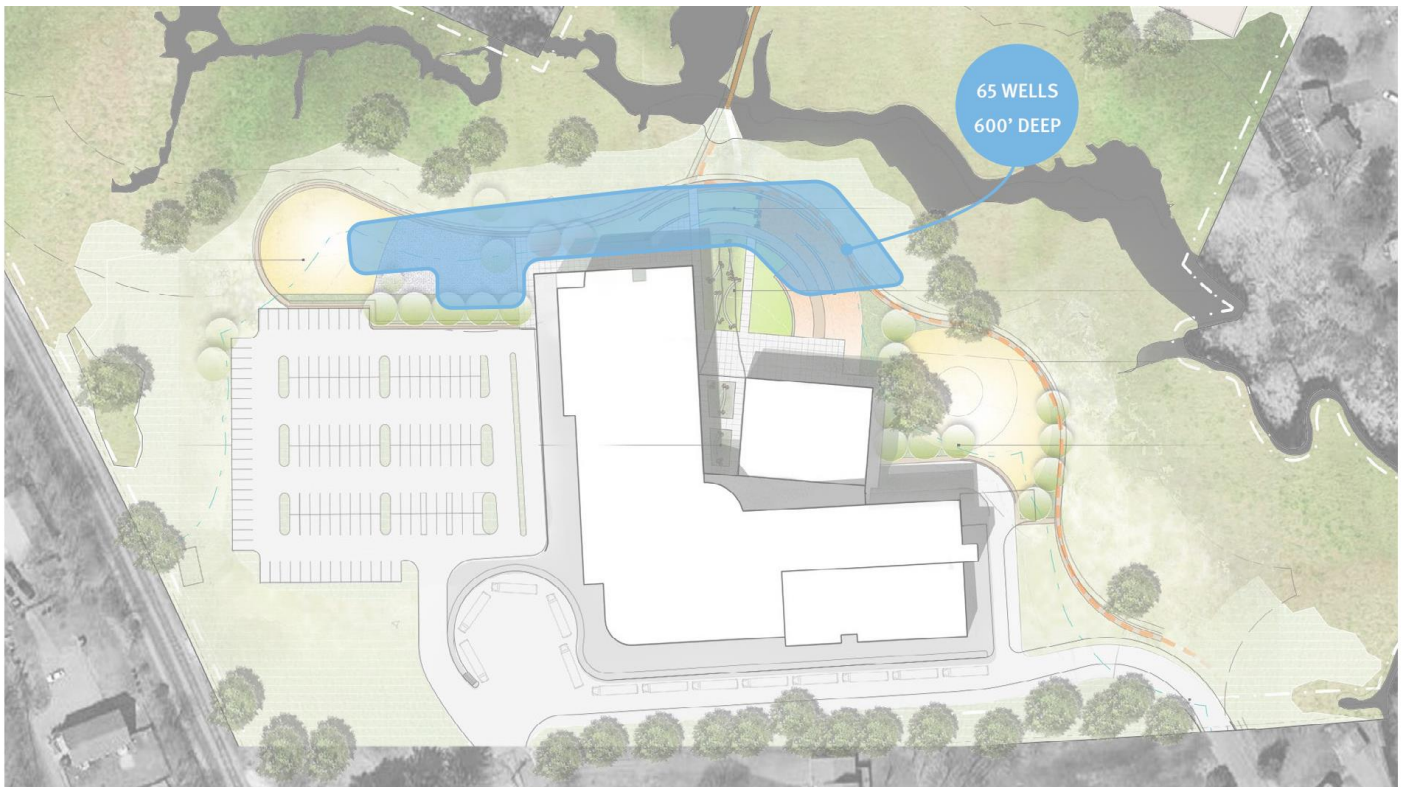
Photo 2: Center for EcoTechnology

Field Measured CFM @ 50 Pascals	Square Feet of Building Shell	CFM50/SF
10,403	157,558	0.06
		<b>CFM50/sf</b>
<b>Douglas &amp; Gates</b>		<b>0.06</b>
Passive House Institute United States		<0.06

This result indicates that the building's air barrier is meeting the Passive House Standard for air tightness.

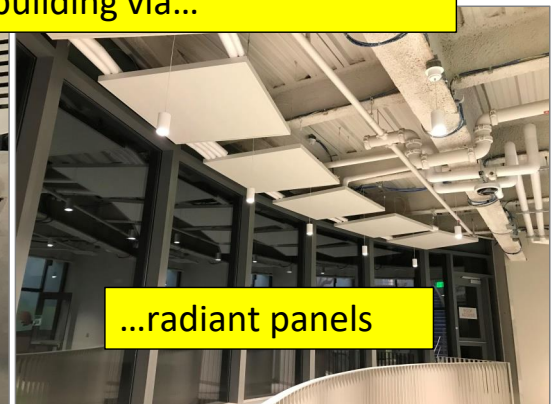
Building Envelope Commissioning Field Report - Final Blower Door Test

# Boardwalk: Geothermal system



**ARROW STREET**

From geothermal loop >> fluid enters bank of heat pumps in mechanical room.  
**Winter:** Low-Temp Hot Water circulates out to the building via...



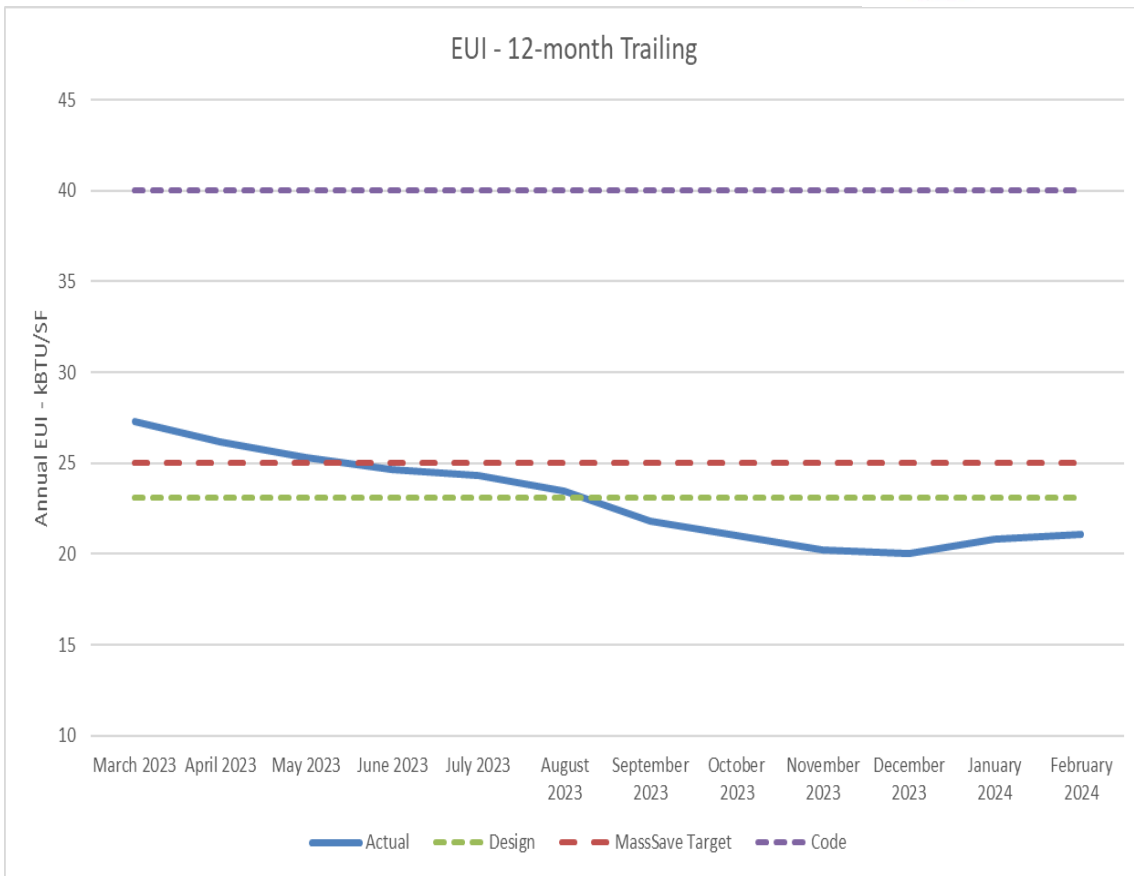
...radiant panels

...Roof-Top Units with Energy Recovery Wheels



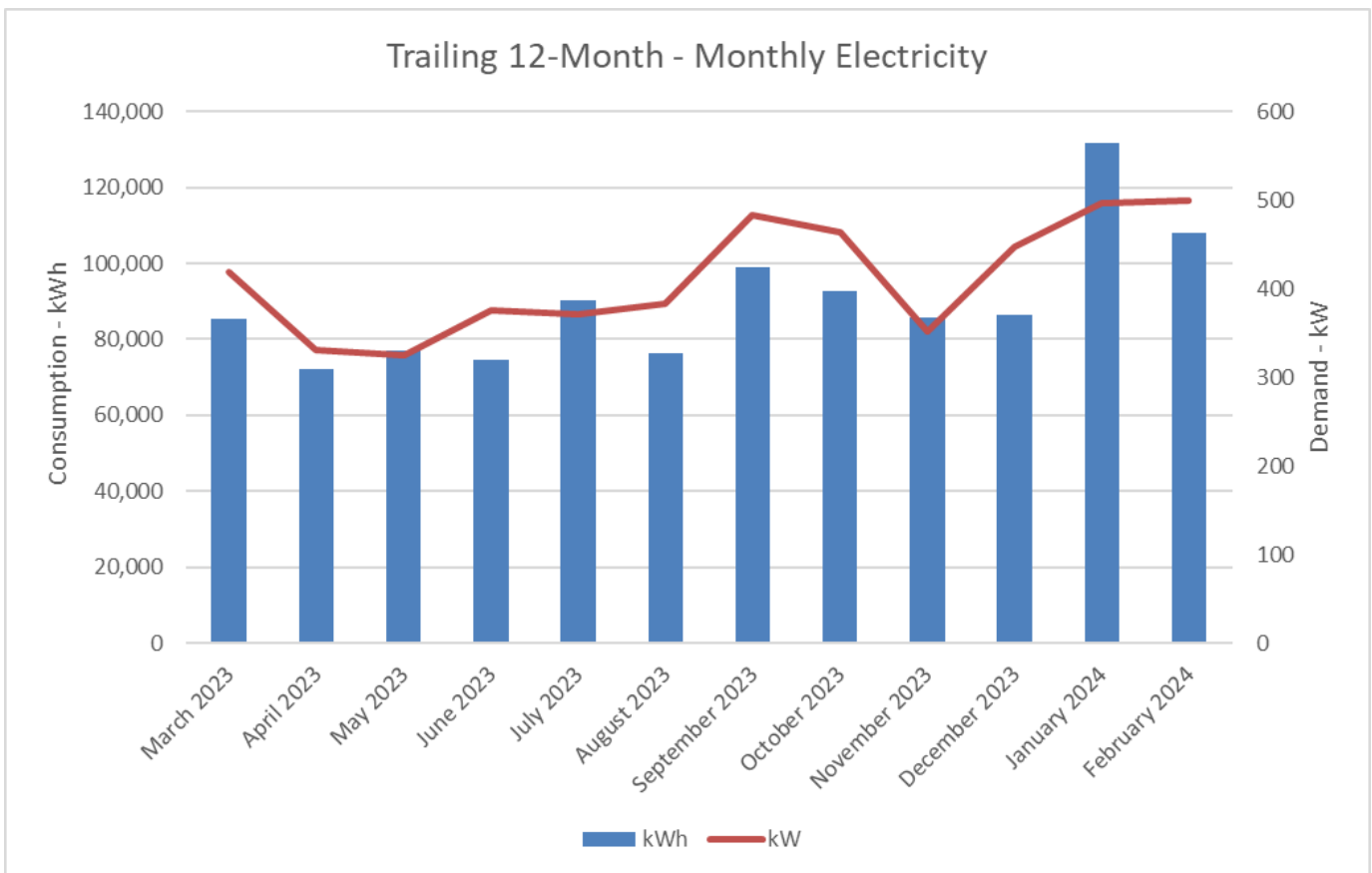
**Warm weather:** system reverses for efficient cooling  
**Shoulder seasons:** even more efficiencies! (COP 6)

# EUI PERFORMANCE

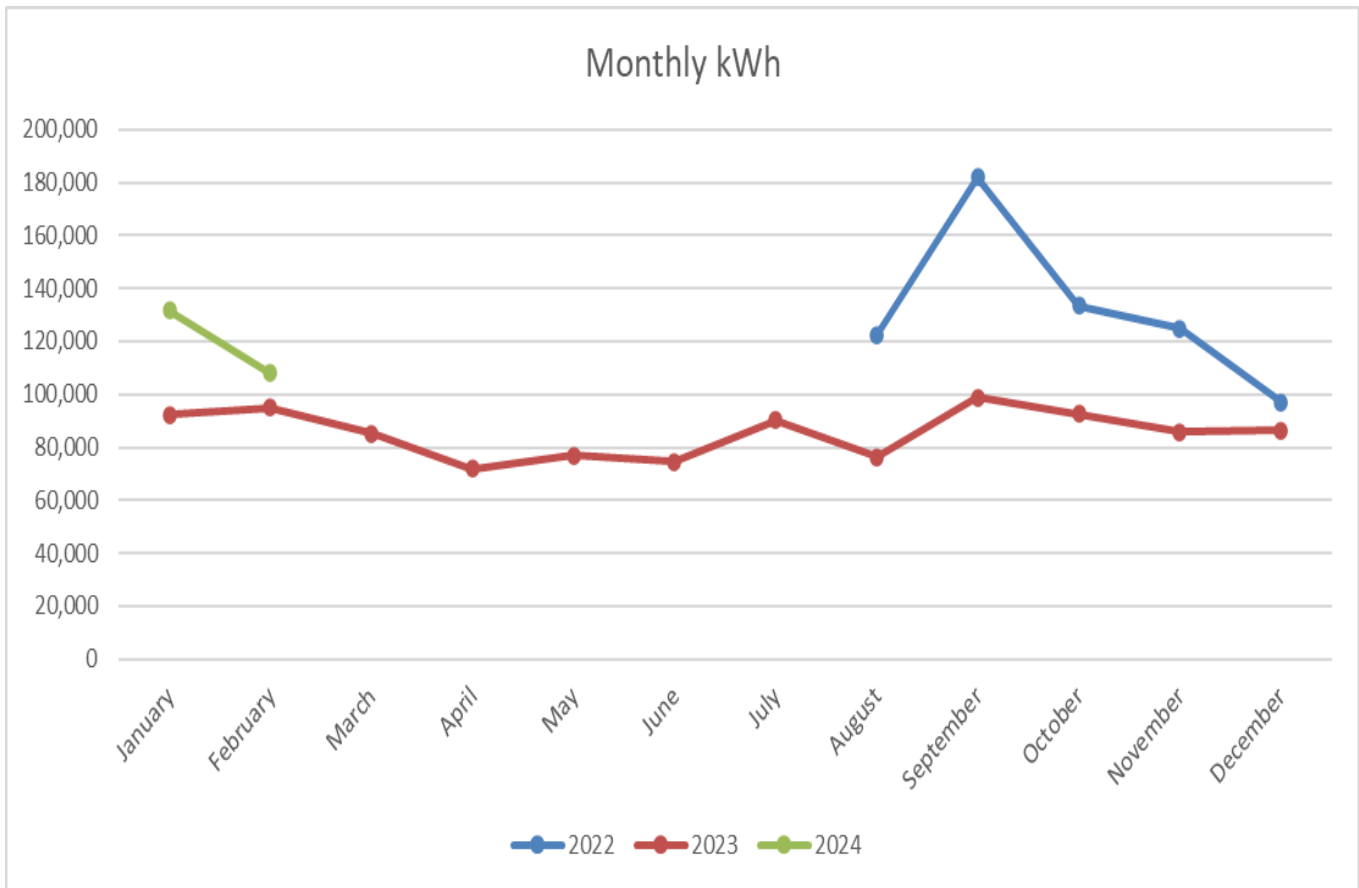


• **16% below MassSave target**

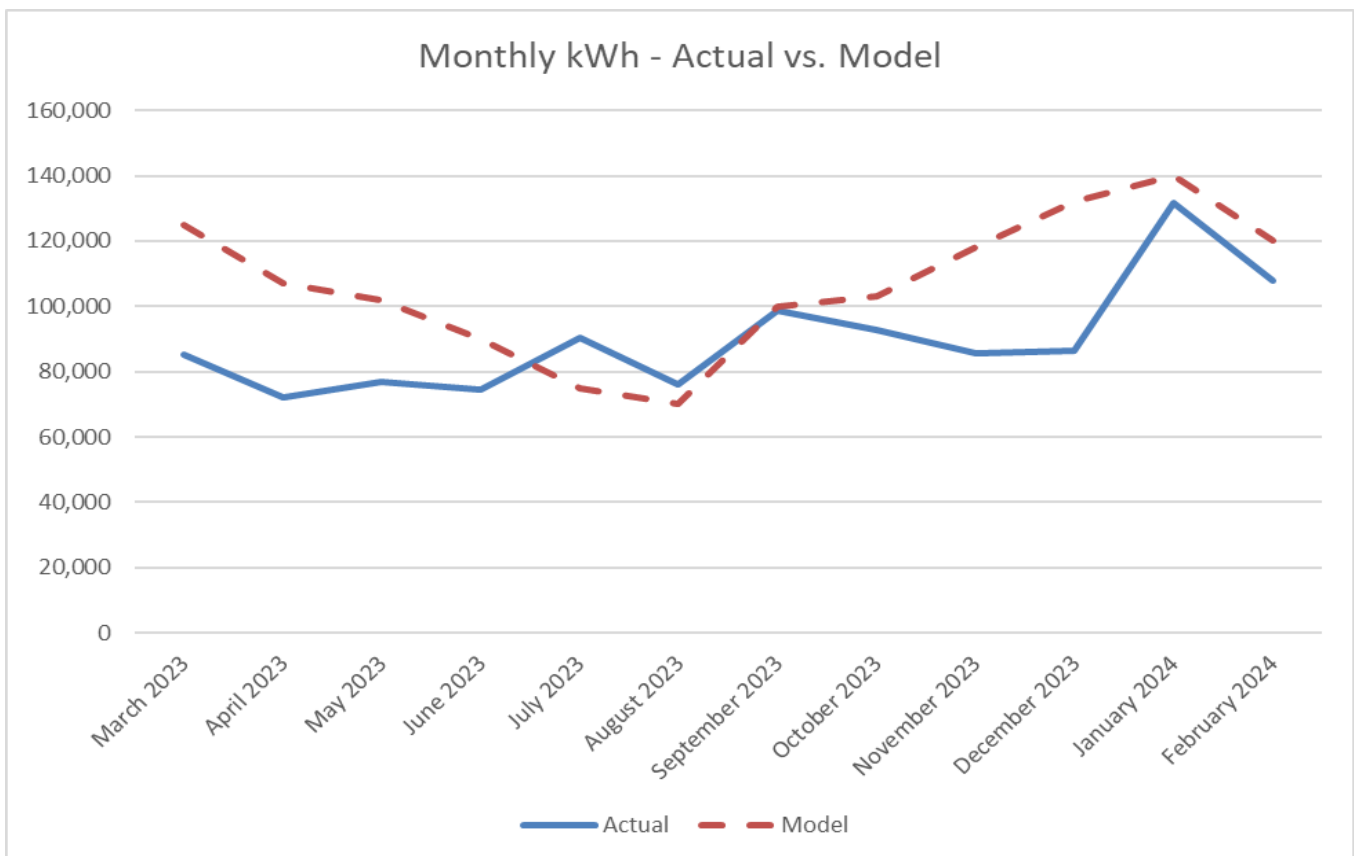
# MONTHLY UTILITY DATA



# MONTHLY UTILITY DATA



# MONTHLY ENERGY CONSUMPTION ACTUAL TO MODEL



# Electricity prices >> more stable, less inflation over time

## Fossil fuel prices are rising far faster than others

Price increases in U.S. from April 2021 to April 2022

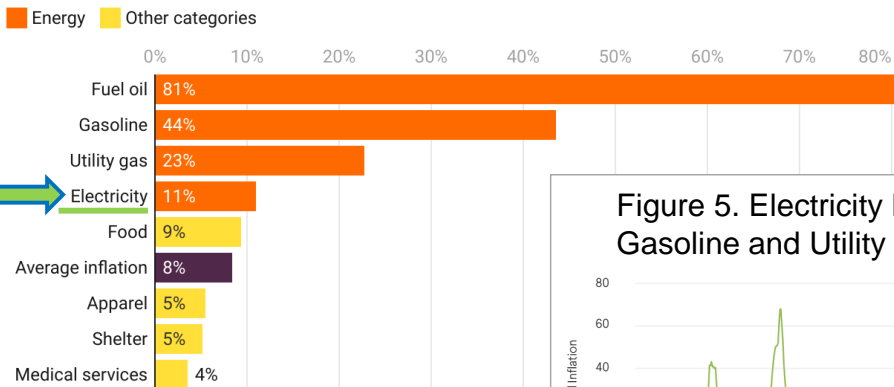


Chart: Canary Media • Source: U.S. Bureau of Labor Statistics

### Figure 5. Electricity Prices Less Volatile Than Gasoline and Utility Gas

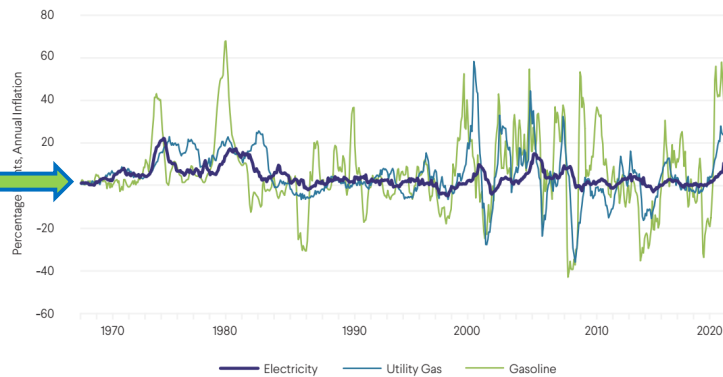


Figure 5 shows the annual rate of inflation of three major consumer energy items (gasoline, utility gas, and electricity service) from 1968 to the present. Gasoline (and utility gas to a lesser extent) prices historically experience large increases and decreases, while electricity service has never had such extreme price volatility. Source: US Bureau of Labor Statistics (2021b), authors' analysis.

<https://www.canarymedia.com/articles/fossil-fuels/chart-fossil-fuels-are-a-big-driver-of-inflation>  
<https://rooseveltinstitute.org/publications/energy-price-stability/>