



# CY 2019 Semi-Annual Energy Report

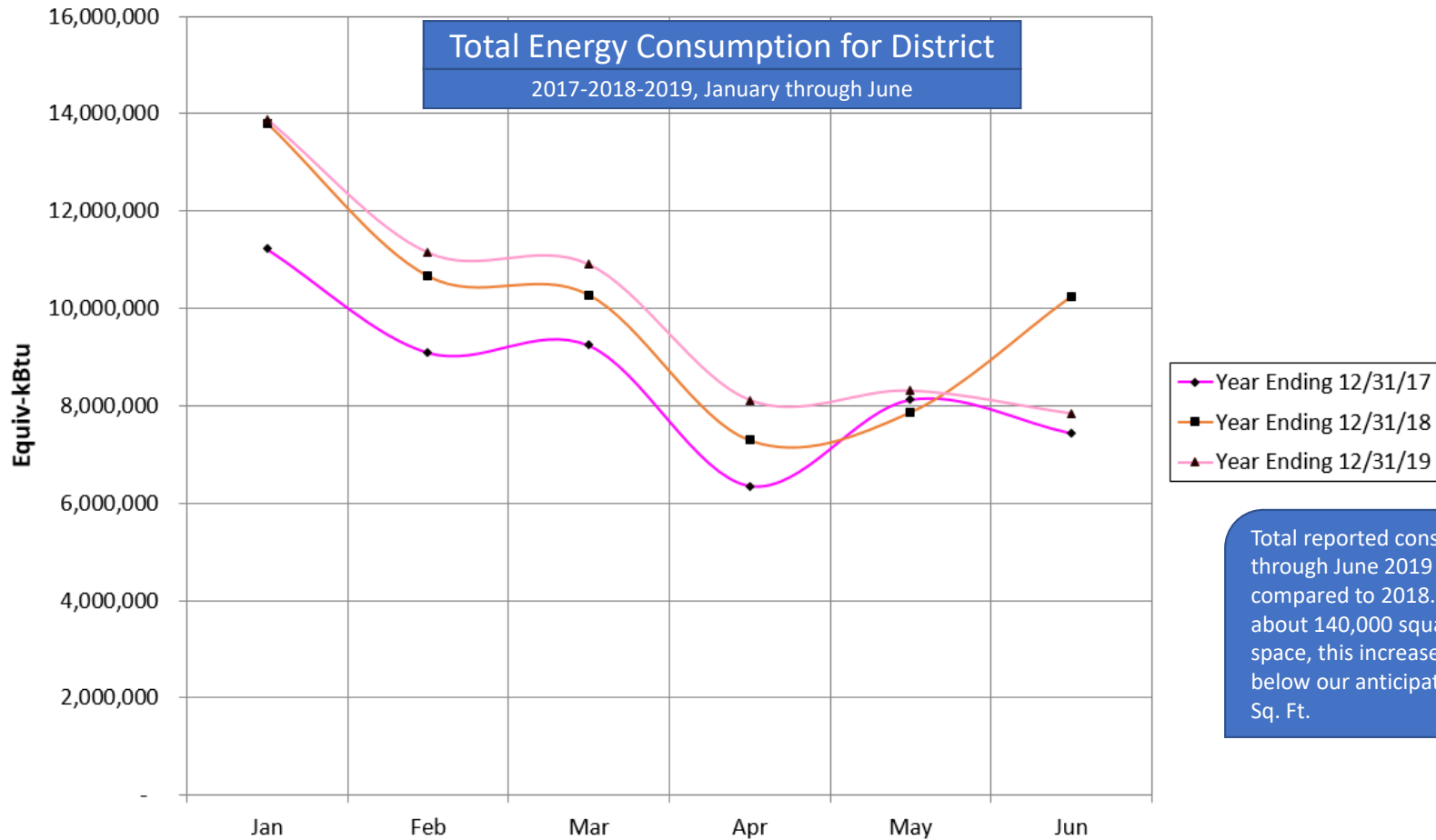
January 2019 – June 2019

Kim Melander, Energy Manager

11/11/2019

One Team. One Mission. One Rock Hill.

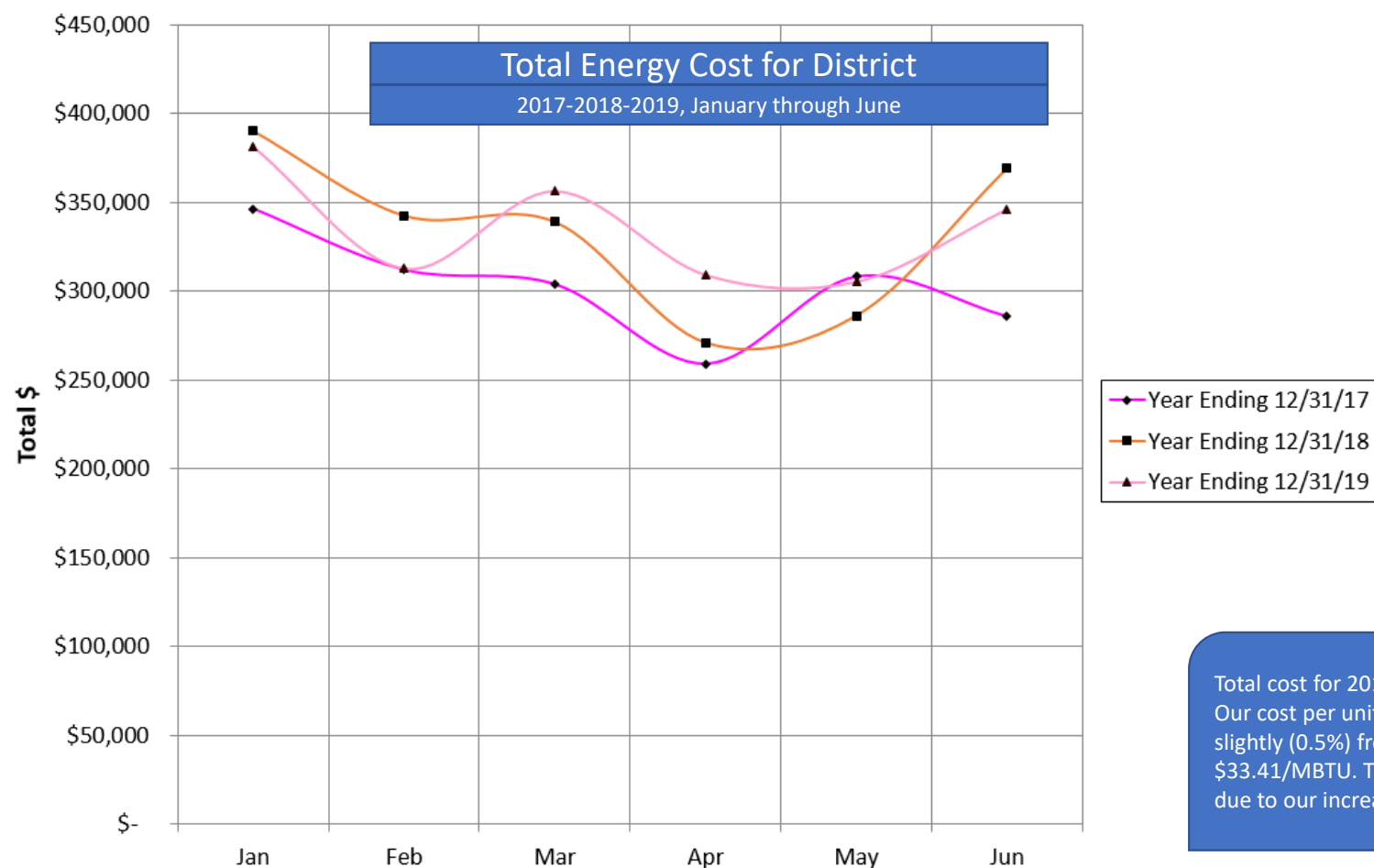
# Actual Equiv-kBtu for Rock Hill Schools Project



Total reported consumption for January through June 2019 increased 0.1% compared to 2018. Considering we added about 140,000 square feet of new floor space, this increase (\$0.36 / Sq. Ft.) is well below our anticipated (2018 KPI) \$0.58 / Sq. Ft.

Date	Jan	Feb	Mar	Apr	May	Jun	Total
Year Ending 12/31/17	11,226,434	9,090,493	9,239,965	6,347,638	8,118,954	7,431,090	51,454,574
Year Ending 12/31/18	13,801,060	10,663,141	10,277,442	7,292,501	7,857,162	10,233,723	60,125,029
Year Ending 12/31/19	13,880,923	11,140,229	10,899,693	8,114,341	8,304,527	7,836,086	60,175,799

# Actual Total \$ for Rock Hill Schools Project

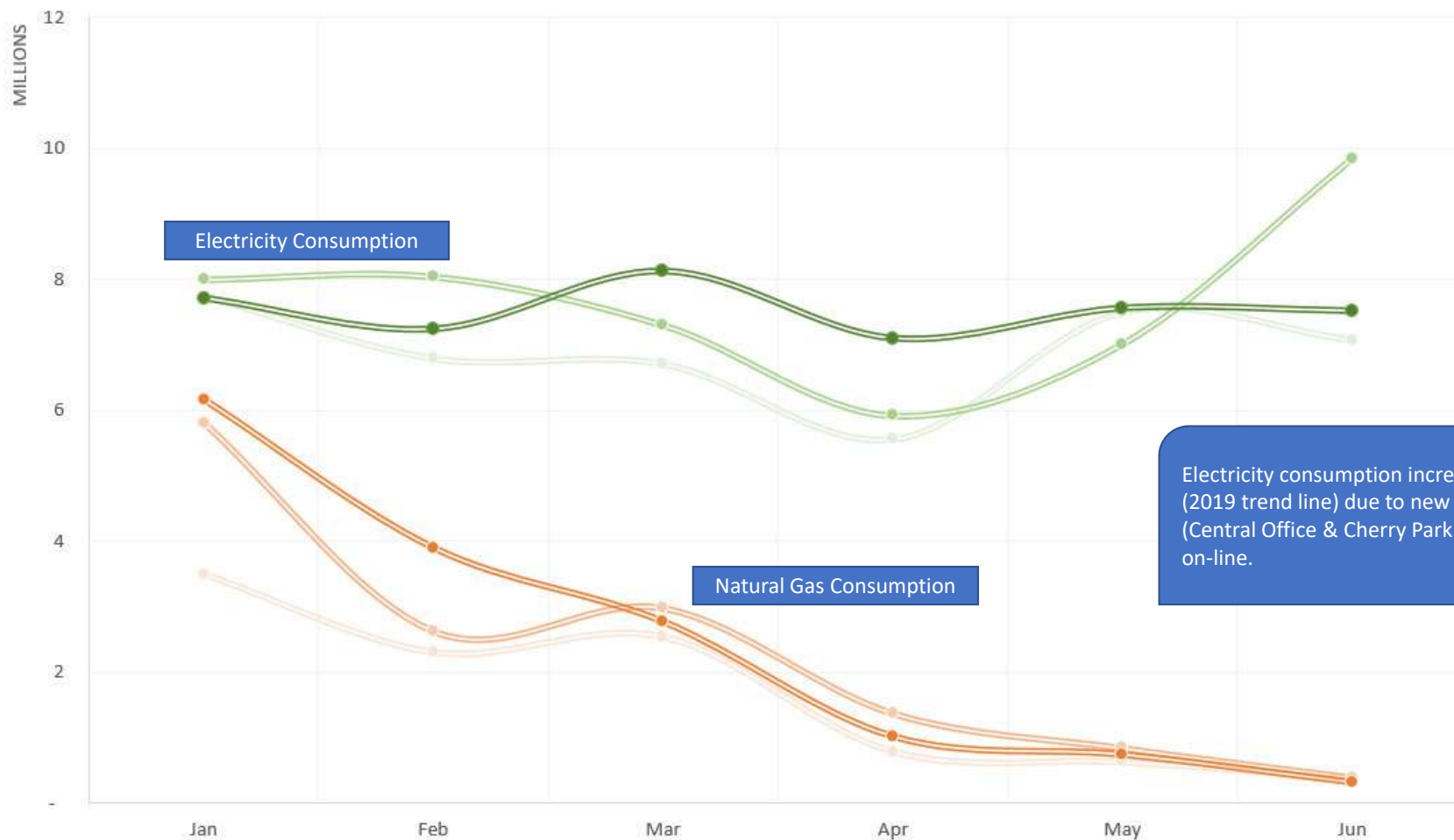


Total cost for 2019 increased only 0.6%. Our cost per unit of energy increased slightly (0.5%) from \$33.23/MBTU to \$33.41/MBTU. The remaining increase is due to our increase in consumption.

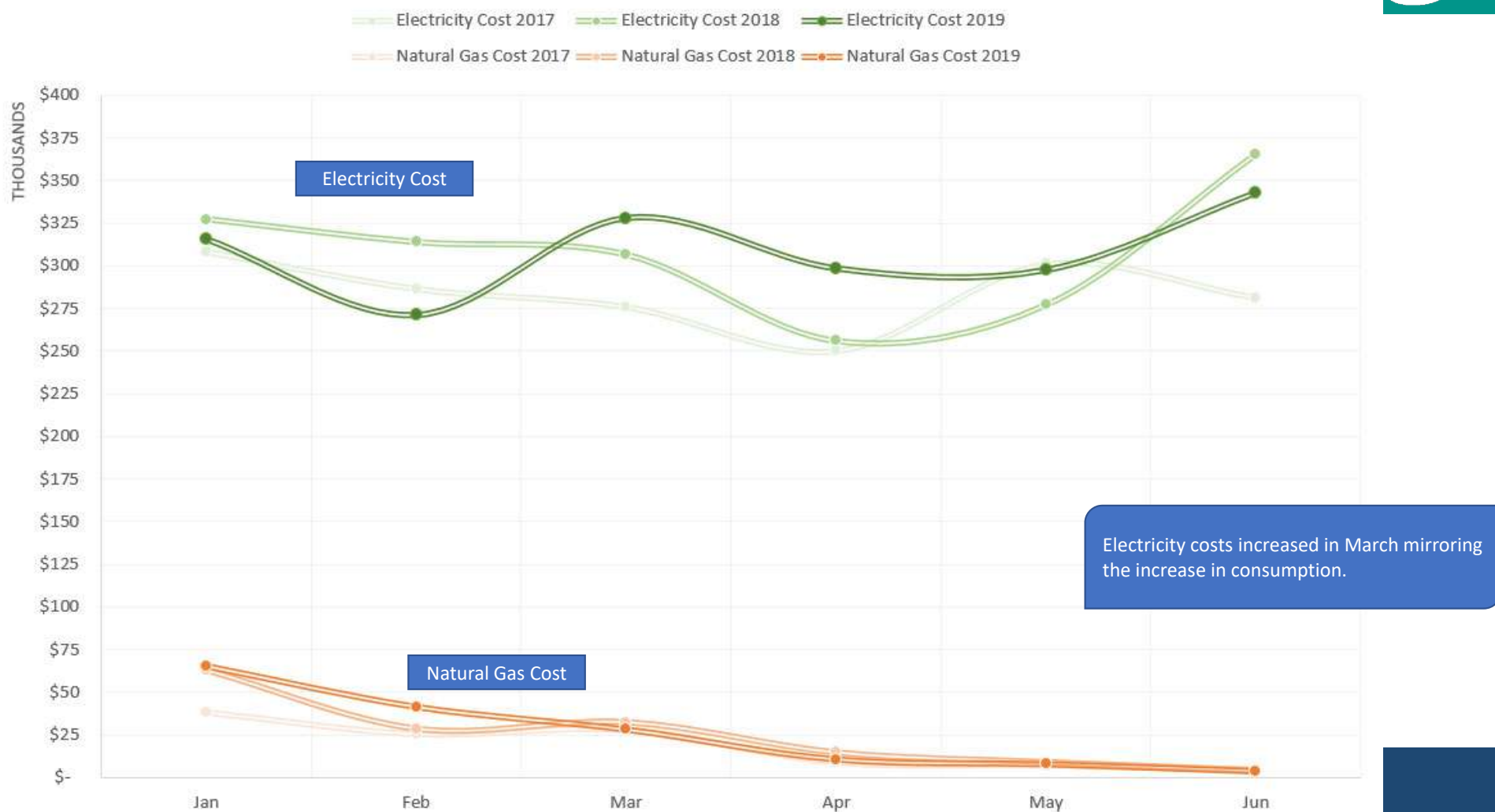
Date	Jan	Feb	Mar	Apr	May	Jun	Total
Year Ending 12/31/17	\$ 346,273	\$ 311,848	\$ 303,622	\$ 258,750	\$ 307,982	\$ 285,441	\$ 1,813,917
Year Ending 12/31/18	\$ 390,193	\$ 342,450	\$ 338,917	\$ 270,764	\$ 286,075	\$ 369,371	\$ 1,997,769
Year Ending 12/31/19	\$ 380,897	\$ 312,700	\$ 356,138	\$ 309,130	\$ 305,353	\$ 346,071	\$ 2,010,289

## ENERGY USAGE

KBTU Electricity 2017 KBTU Electricity 2018 KBTU Electricity 2019  
KBTU Natural Gas 2017 KBTU Natural Gas 2018 KBTU Natural Gas 2019

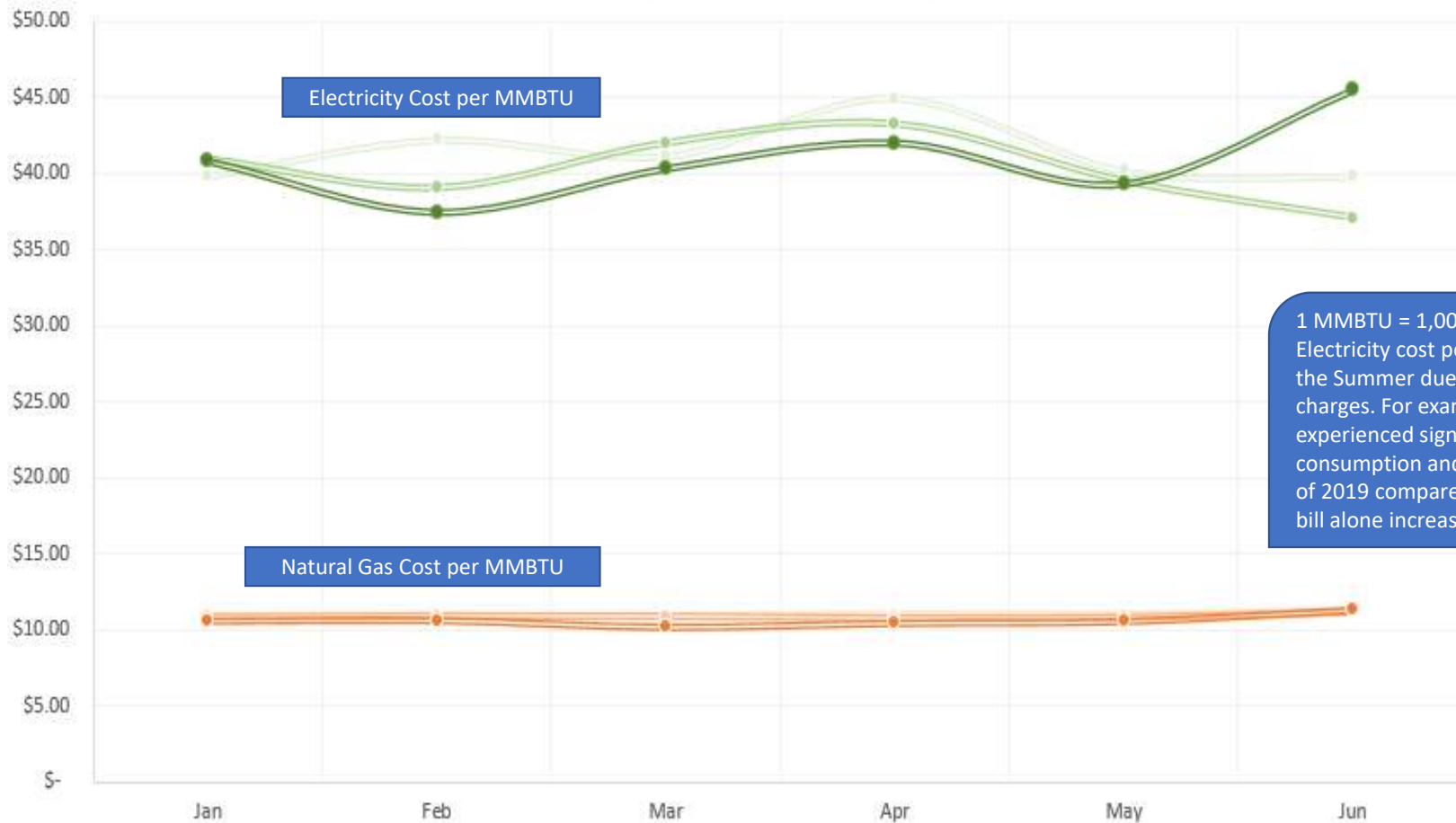


## ENERGY COSTS



## ENERGY COST PER UNIT

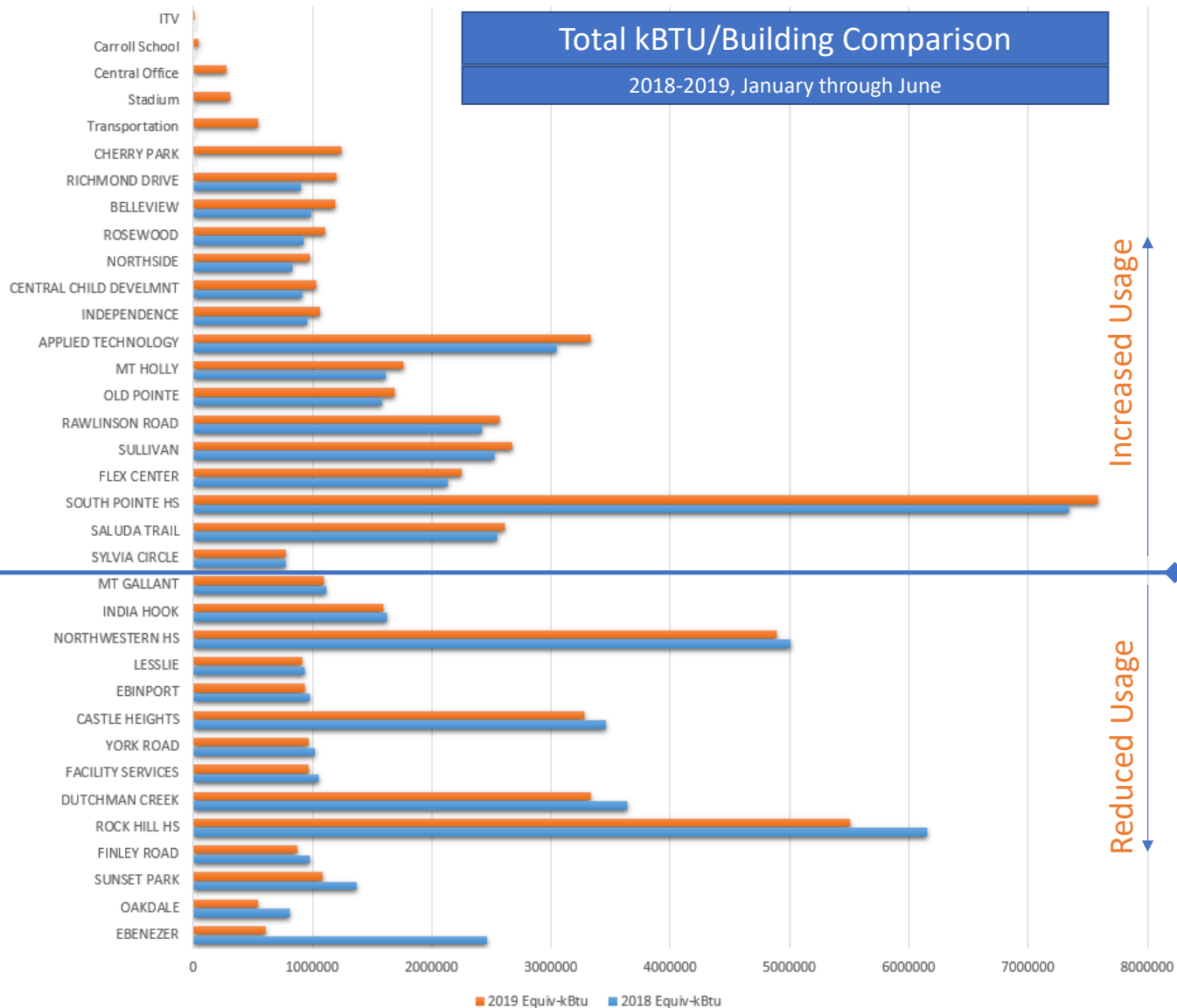
Electricity \$/MMBTU 2017 Electricity \$/MMBTU 2018 Electricity \$/MMBTU 2019  
 Natural Gas \$/MMBTU 2017 Natural Gas \$/MMBTU 2018 Natural Gas \$/MMBTU 2019



1 MMBTU = 1,000,000 BTU  
 Electricity cost per unit can rise during the the Summer due to increased demand charges. For example, South Pointe HS experienced significant increases in consumption and costs during the summer of 2019 compared to 2018. Our June utility bill alone increased by \$20k.

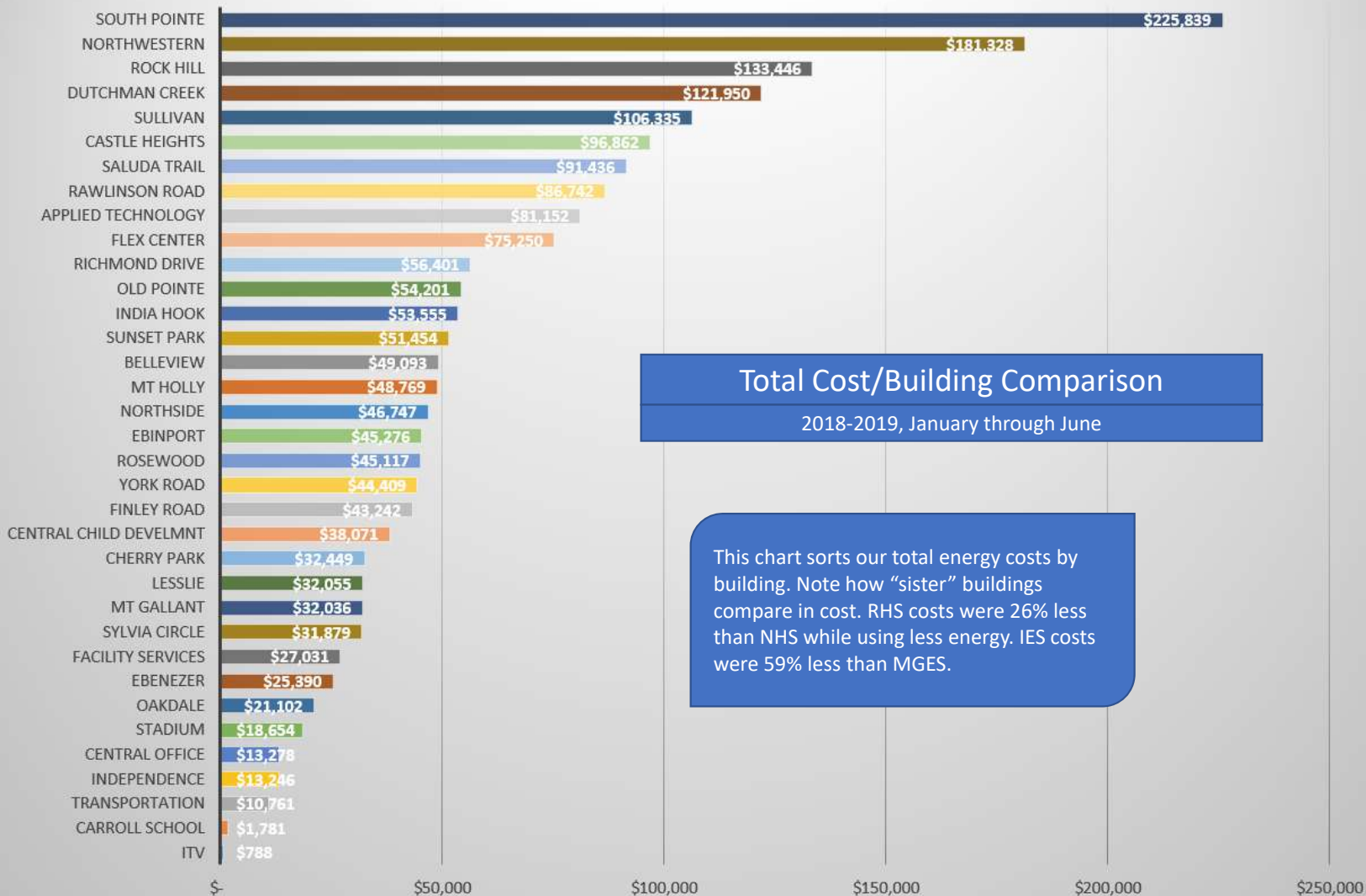
## Total kBTU/Building Comparison

2018-2019, January through June



The six locations at the top of this chart were added for this reporting period. The Central Office and Cherry Park ES are new buildings. The remaining four sites had not been included in previous reporting. If we remove these six sites from the kBTU totals, 2019 would show a 2.8% reduction in energy consumption. This chart is sorted in order of largest increase in usage at the top, and greatest decrease in usage at the bottom.

## Comparison of Actual Total \$ for Selected Areas





Baseline period (CY2009)

Current period (CY2019)

Difference between baseline  
and current periods

Adjustments to baseline data  
using current weather and  
cost data

### Actual Use and Cost for Base Period (1/2009 through 6/2009)

Energy Type	Base Use Recorded	Units	Avg Unit Cost	Energy Cost
Electric	17,180,855	kWh	0.1043	\$1,792,325
Natural Gas	192,152	Therm	1.2626	\$242,618
<b>Total Energy:</b>	<b>77,853,458</b>	<b>kBtu</b>	<b>Total Cost</b>	<b>\$2,034,943</b>

### Actual Use and Cost With Energy Management Program (1/2019 through 6/2019)

Energy Type	Current Use Recorded	Units	Avg Unit Cost	
Electric	13,264,479	kWh	0.1397	\$1,853,208
Natural Gas	149,174	Therm	1.0530	\$157,081
<b>Total Energy:</b>	<b>60,189,067</b>	<b>kBtu</b>	<b>Total Cost</b>	<b>\$2,010,289</b>

### Energy Saved 2019 Compared to Base Period

Energy Type	Base - Current	Units	Percent Saved	Total Cost
Electricity	3,916,376	kWh	23%	(\$60,883)
Natural Gas	42,978	Therm	22%	\$85,537
<b>Total Energy Saved:</b>	<b>17,664,391</b>	<b>kBtu</b>	<b>Gross Savings:</b>	<b>\$24,654</b>
<b>Percent Savings:</b>	<b>23%</b>			<b>1%</b>

### Cost Avoidance - Without Our Energy Program:



Rates: Base period consumption at current period rates would be an additional: \$567,767

"Load Creep": Additional equipment, operating hours  
and efficiency lost due to age would cost: \$24,004

Adjustments for weather, bill period differences & other deviations. \$43,603

**Total Cost Avoidance:** \$660,028

**Adjusted Savings:** 25%

# Energy/Public Utility - Budget Performance

## 2018-2019 Budget Performance - Actual

- Total Budget \$4.7M, actual **\$4.692M**
  - Energy - \$4.29M, actual \$4.147M = **\$143k Surplus**
  - Public Utilities - \$410k, actual \$545k = **\$135k over budget**

## 2019-2020 Budget Planning

- Total recommended Budget \$4.9M, **March - 2019**
  - Energy - \$4.385M (projected \$4.2M 18-19SY + \$99k square footage increases + 2% or \$86k rate escalation)
  - Public Utilities - \$534k (projected \$500k 18-19SY + \$9k square footage increases + 5% or \$25k rate escalation)

## 2019-2020 Expectations & Performance, **October – 2019**

- Total expected cost \$4.87M
  - Energy - 18-19 actual of \$4.147M + \$99k square footage increases + 1% or \$42k rate escalation = \$4.288M
  - Public Utilities - 18-19 actual of \$545k + \$9k square footage increases + 5% or \$28k rate escalation = \$582k
- Performance to date (1<sup>st</sup> Quarter, July through September)
  - Energy - \$1.019M
  - Public Utilities - \$125k

# Update on Projects, Programs and Initiatives

- District Wide EMS (Energy Management Systems)
  - BAS/JACE upgrades
  - Event/after hours scheduling systems upgrades – School Dude
  - Utility Accounting software systems upgrades
- Green Apple Energy Conservation Program
- Energy Star Building Certifications
- Replacement/Improvement Projects
  - Central Child Development Center RTU (Roof Top Unit) HVAC replacements
  - RHHS, NHS and SPHS Gym Lighting upgrades
  - NHS Gym Chiller replacement

Thank You for your support!



One Team. One Mission. One Rock Hill.

1. We use the industry accepted standard for energy measurement and verification (M&V) known as the International Performance Measurement and Verification Protocol (IPMVP). The first step is to establish a baseline period of time and energy data set. This will be historic information about energy consumption and costs prior to the implementation of any conservation programs. This information is entered into a special utility accounting software package.
  - The baseline is a fixed period of time – typically 1 year. Ours is CY 2009. We then:
    - Record all energy consumption – standardized unit of measure is typically kBTU which abbreviates kilo British thermal unit. Electrical kWh and Natural Gas (NG) therm units are converted.
    - Record all energy costs.
    - Record measureable variables that affect energy consumption such as weather and occupancy.
  - Our baseline comparisons are expressed as “Cost Avoidance” because the savings figures are calculated or “normalized” to account for differences in weather conditions, utility rates, billing cycles and changes in construction.

1 kBTU = 1,000 BTU

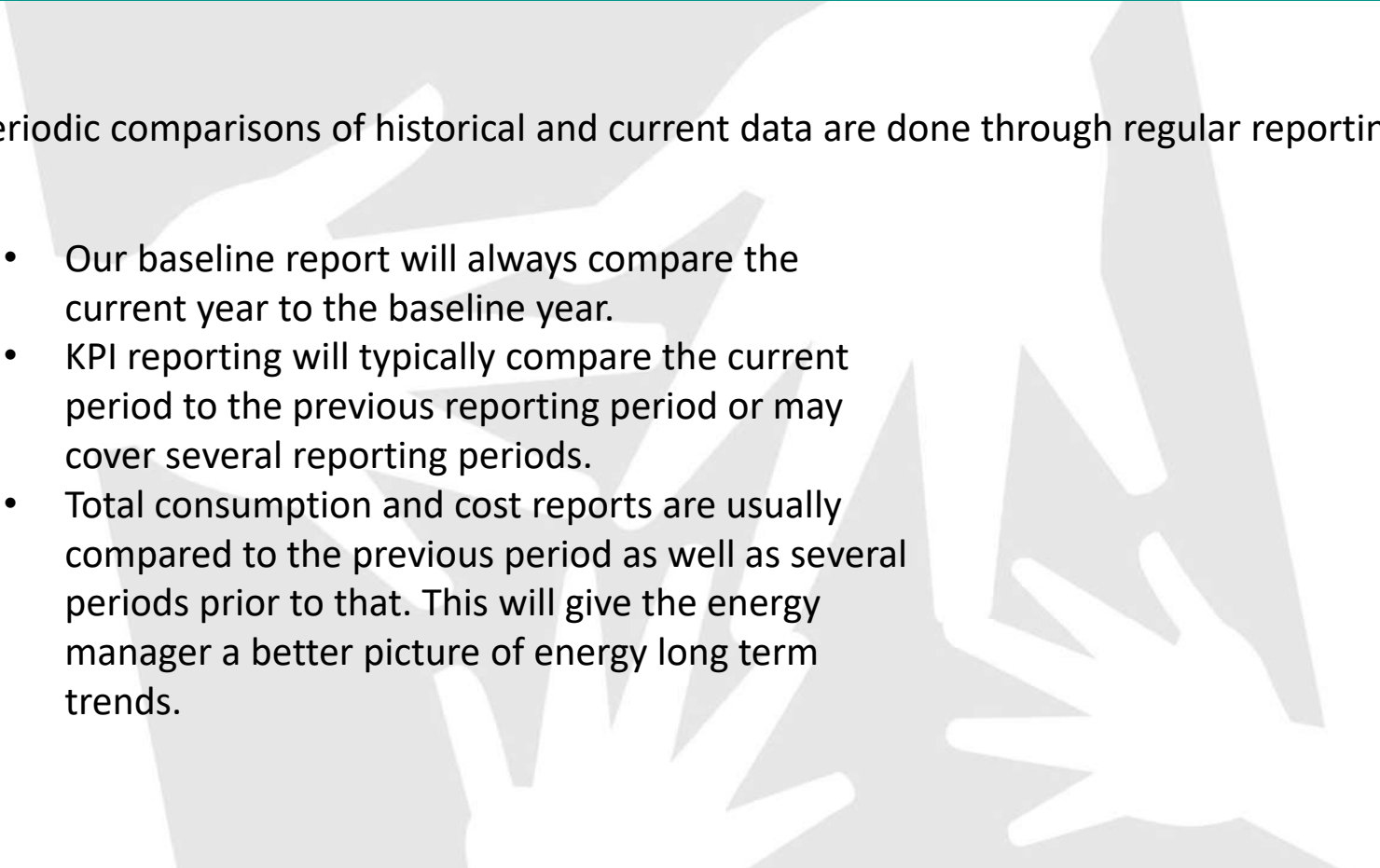
1 MMBTU = 1,000,000 BTU

1 Therm NG = 100,000 BTU

1 kWh = 3,412 BTU

1 MWh = 1,000,000 kWh

2. Benchmarking is comparing common performance measurements to similar, “competing” facilities. For example, we benchmark against other National and State K-12 public school districts.
- Common and universally accepted benchmark performance measurements are referred to as “Key Performance Indicators” abbreviated as KPI.
  - Consumption per square foot of conditioned floor area – units are **kBTU/sq.ft.**. This value is also known as the “Energy Usage Intensity” abbreviated as EUI.
  - Energy cost per square foot of conditioned floor area – units are **\$/sq.ft.**
  - Consumption and cost per student. – **kBTU/student and \$/student.**

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- A large, faint background graphic consisting of several hands of different sizes and orientations, some pointing towards the center, creating a sense of unity and teamwork.
3. Periodic comparisons of historical and current data are done through regular reporting.
    - Our baseline report will always compare the current year to the baseline year.
    - KPI reporting will typically compare the current period to the previous reporting period or may cover several reporting periods.
    - Total consumption and cost reports are usually compared to the previous period as well as several periods prior to that. This will give the energy manager a better picture of energy long term trends.