



Public Works Department

Commissioner of Public Works – Tim Keef, P.E.

Evert Garcia
Assistant Engineer

April 4, 2019

Honorable Town Board
Town of Brighton
2300 Elmwood Avenue
Brighton, NY 14618

Re: 2018 Benchmarking Report

Dear Supervisor Moehle and Town Board Members:

In 2017 the Town of Brighton passed the Local Law for Energy Benchmarking Municipal Buildings of the Town of Brighton. This local law requires the Town of Brighton to annually report the energy use of covered municipal buildings, a practice known as benchmarking. The following document constitutes the second benchmarking report prepared by the Town of Brighton since the enactment of the local law. I recommend that your Honorable Body receive and file the attached 2018 Benchmarking Report.

Respectfully,

Evert Garcia
Assistant Engineer
Department of Public Works

Cc: Mike Guyon, Commissioner of Public Works

Attachment



Town of

Brighton

Year-End Benchmarking Report

For year
2018

Prepared by:
Town of Brighton
Department of Public Works

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I. Overview

Climate change is the result of the combustion of fossil fuels and other human activity¹. Tracking and reporting building energy use is one exercise that has shown to help raise awareness and often result in significant energy reduction². The first Town of Brighton Year-End Benchmark Report was published in 2018 to comply with the 2017 Local Law for Energy Benchmarking for Municipal Buildings of the Town of Brighton. This local law requires the Town of Brighton to annually report their energy use for covered municipal buildings, a practice known as benchmarking. Benchmarking measures the total electricity and natural gas consumed in a building and adjusts for other factors so that the Town can understand how efficiently each building uses energy. This information allows the Town to prioritize buildings for energy efficiency investments and to monitor building performance over time.

II. Methodology

The data for the 2018 Benchmark Review was collected and evaluated using the same methods as the 2017 dataset. The report shows the energy use intensity (EUI) and GHG emissions calculated by the U.S. EPA's Portfolio Manager benchmarking tool for each Town building. Energy consumption is aggregated on a building level before the data is loaded into Portfolio Manager. The EUI calculations are performed by the ENERGY STAR Portfolio Manager tool according to the EPA's technical methodology.

For benchmarking purposes, the Town of Brighton's covered municipal buildings have been divided into three sectors as depicted in Figure-1, Operations, Town Hall and Parks & Recreation, which mimics the 2014 Greenhouse Gas Inventory organizational structure. Each covered municipal building's energy use and GHG emissions were computed by the software from electrical and natural gas bills which were inputted for each calendar year.

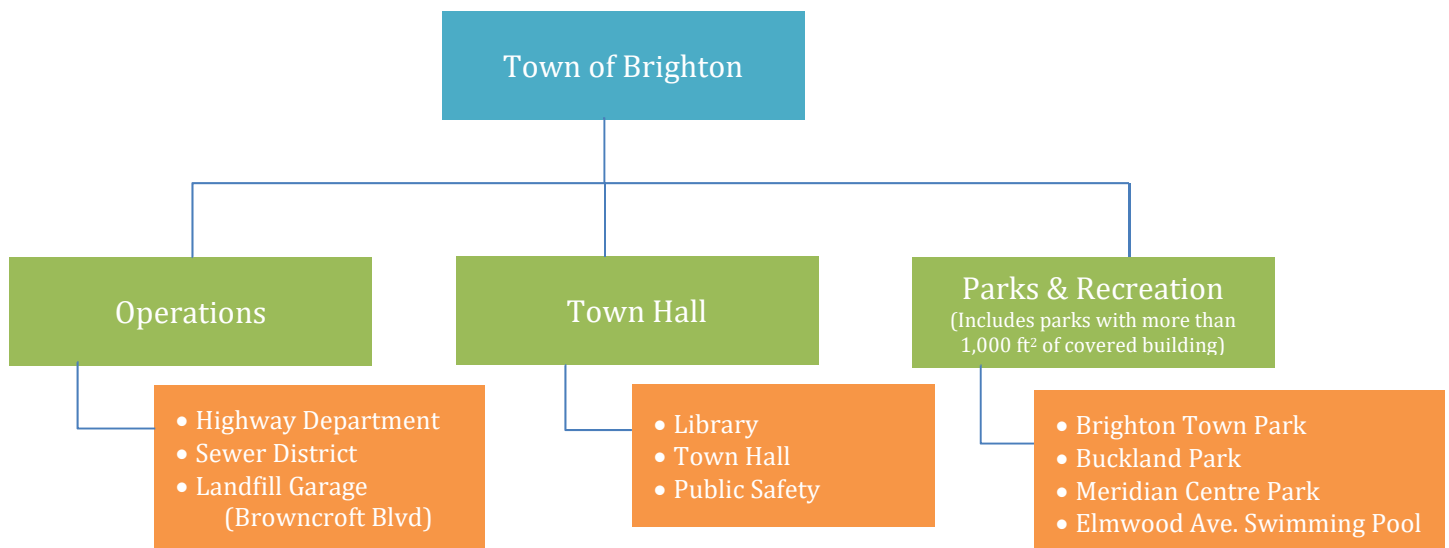


Figure-1. Town Organizational Breakdown



III. Summary of Results for 2018

The total GHG emitted from covered municipal buildings in the Town of Brighton was **506.2** MTCO_{2e} for the 2018 calendar year. This year’s total GHG emissions represent a 2.6% increase from the **492.8** MTCO_{2e} which was calculated for the 2017 calendar year. Table 1 summarizes the energy consumption for the covered municipal buildings in each sector derived from the benchmarking information.

Table 1: GHG Emissions Summary per Sector

Sector	Total Annual GHG Emissions (MTCO _{2e})	Percentage (%)
Operations	175.7	35
Town Hall	296.9	59
Parks & Recreation	33.6	6
Total:	506.2	100

Tables 2-4 below further break down the energy use and emissions by each covered municipal building in all three sectors.

Table 2: Energy Summary by Building in Operations Sector

Operations					
Building Name	Address	Gross Floor Area (ft ²)	Site EUI (kBtu/ft ²)	Weather Normalized Source EUI (kBtu/ft ²)	Annual GHG Emission (MTCO _{2e})
Highway Department	1941 Elmwood Ave.	43,000	76.3	77.3	164.0
Landfill Garage (Browncroft Blvd)	444 Browncroft Blvd	3,000	76.8	77.4	11.7

Table 3: Energy Summary by Building in Town Hall Sector

Town Hall					
Building Name	Address	Gross Floor Area (ft ²)	Site EUI (kBtu/ft ²)	Weather Normalized Source EUI (kBtu/ft ²)	Annual GHG Emission (MTCO _{2e})
Town Hall and Library	2300 Elmwood Ave.	56,714	112.8	112.1	296.9

Table 4: Energy Summary by Building in Parks & Recreation Sector

Parks & Recreation					
Building Name	Address	Gross Floor Area (ft ²)	Site EUI (kBtu/ft ²)	Weather Normalized Source EUI (kBtu/ft ²)	Annual GHG Emission (MTCO _{2e})
Brighton Town Park	777 Westfall Rd.	2,500	55.3	58.5	6.6
Buckland Park	1341 Westfall Rd.	6,100	95.6	96.6	24.8
Meridian Centre Park	2025 South Winton Rd.	1,300	20.1	19.7	1
Elmwood Ave. Swimming Pool	2300 Elmwood Ave.	2,700	11.7	10.7	1.2

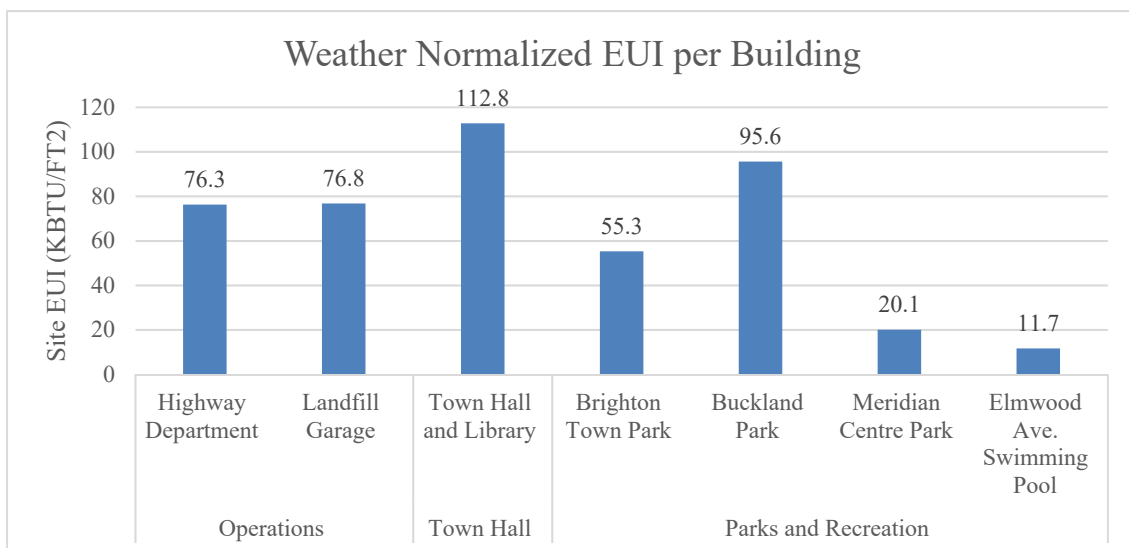
IV. Energy Use Intensity

Energy Use Intensity (EUI) is a building's total annual energy use (electricity, natural gas) divided by its gross floor area. It is measured in kBtu/sf (one thousand British thermal units per square foot). Since EUI normalizes for size, the energy use of similar building types can be compared. Higher EUIs show greater energy use, whereas lower EUIs indicate more energy efficient buildings.

The Town Hall building, which has the highest gross floor area (56,714 ft²), is responsible for 59% of the covered municipal facility GHG emissions. Additionally, Portfolio Manager determined that the Town Hall building has the highest Source Energy Use Intensity (EUI) of the buildings measured with a value of 112.8 kBtu/ft². The median weather normalized EUI for all Town owned facilities which have been benchmarked is **76.3** kBtu/ft².

Unfortunately, Portfolio Manager does not track nationwide median EUI values for the “Other” building category, which is what all the Town’s municipal facilities fall under. Therefore, currently, it is difficult to accurately compare the Town’s benchmark scores to other buildings of similar nature across the country. Figure 2 below provides Weather Normalized EUI comparison of the buildings benchmarked in the Town of Brighton.

Figure 2: 2018 Weather Normalized Energy Usage per Square Foot by Building



V. Historical Comparison

One of the major objectives of the Energy Benchmarking program is to monitor building performance over time. Town facilities contribute to Brighton's greenhouse gas emissions through energy consumption. Historical comparison of energy benchmarks allows the Town to monitor the trend in energy use and GHG reduction to see if we are on target to meeting the reduction goals established in the Town's Climate Action Plan of 20 by 30 for Town Facilities. Figures 3 and 4 provide a comparison of energy usage (electricity and natural gas) and total emissions for 2014, 2017, and 2018.

Figure 3: Energy Usage Trends

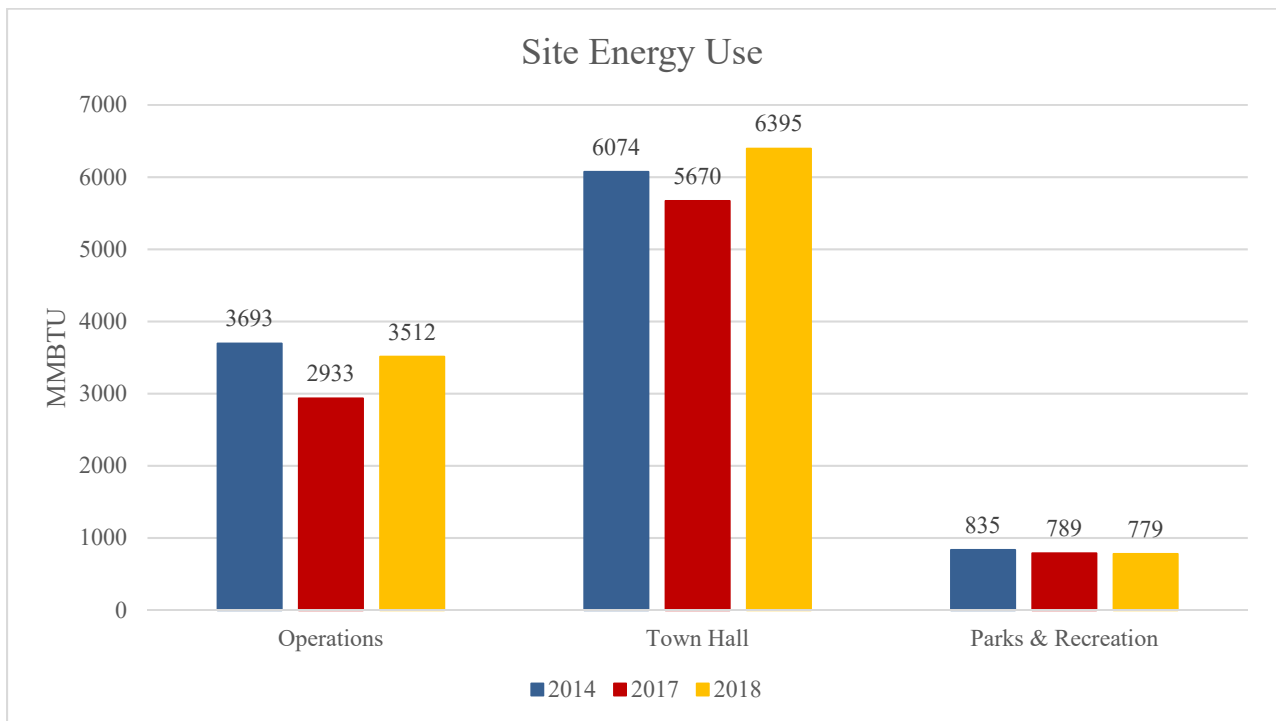
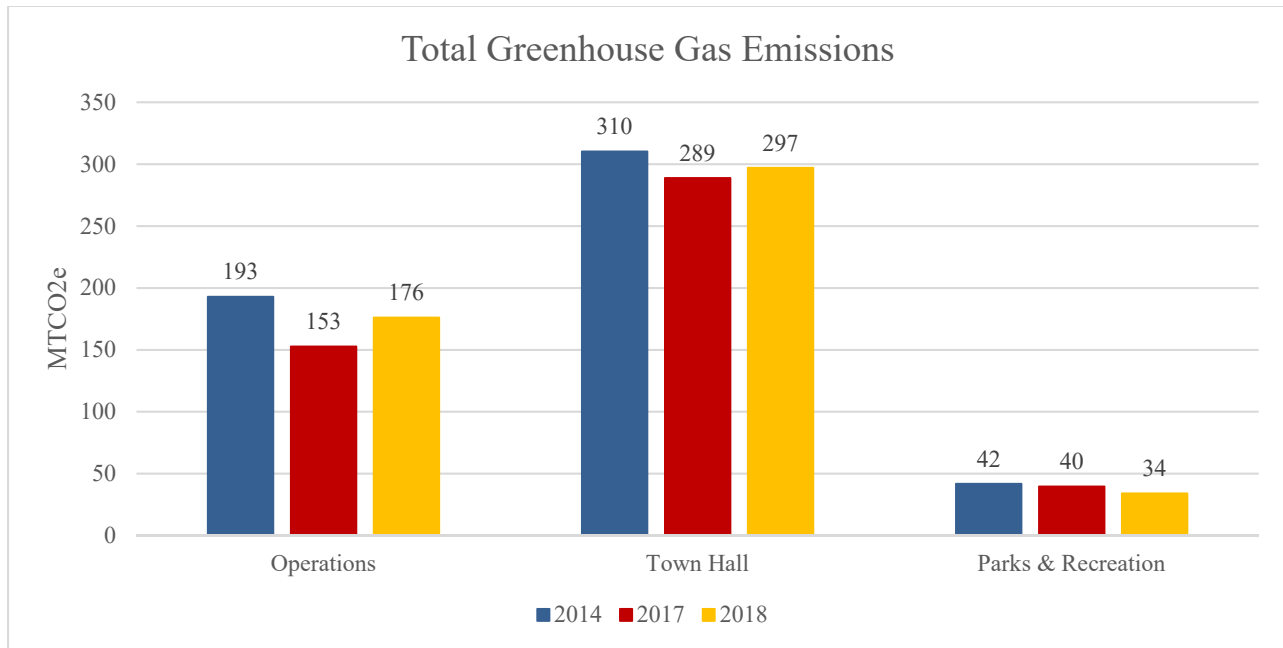
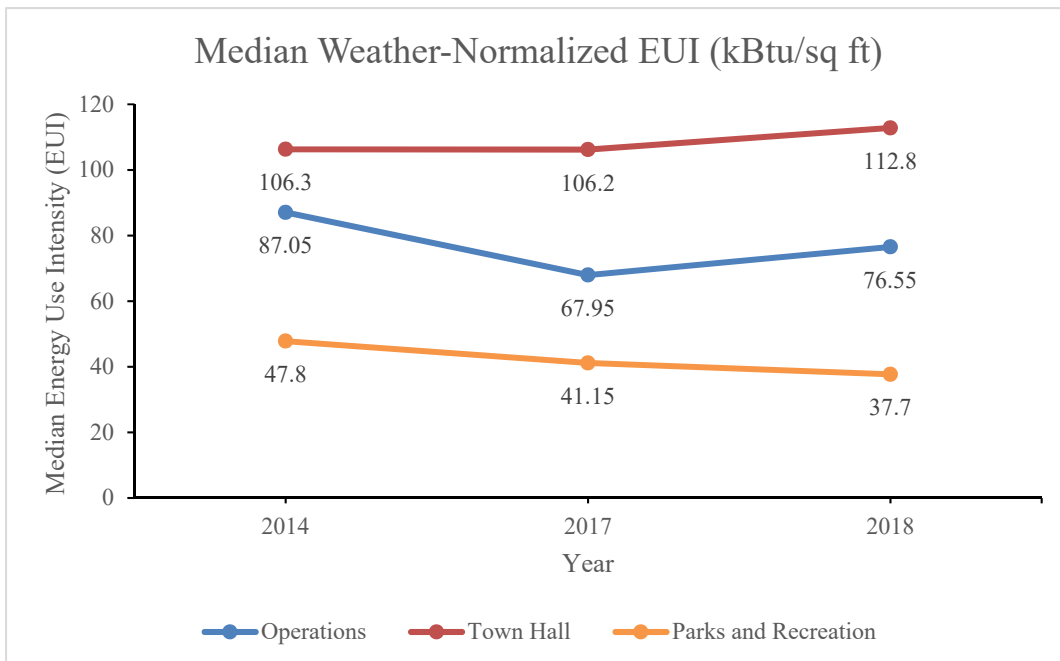


Figure 4: Emissions Trends



When comparing energy consumption and greenhouse gas emissions, we find that there is an increase for most of the facilities from 2017 to 2018. This could be a normalization of data or the beginning of an upward trend. While consumption of energy has increased to resemble 2014 levels, emissions generated by Town Facilities in 2018 trended still below the 2014 benchmark. Assessing the weather normalized EUI values for the benchmarked Town facilities reveals a similar increase of median values from 2017. Figure 5 provides a comparison of the median EUI values for the benchmarked facilities and the respective benchmark year.

Figure 5: Weather Normalized EUI Trends



VI. Conclusion

The year to year analysis revealed a general increase in energy usage and GHG emissions across the Town portfolio except for the Parks & Recreation buildings as shown in Table 6 below.

Table 5: 2017 vs 2018 Energy Usage

	% Change in Site Energy Usage	% Change in Total GHG Emissions
Operations	+20	+15
Town Hall	+13	+3
Parks & Recreation	-1	-14

A possible explanation for the increase in energy usage and emissions is that weather patterns in 2018 were more similar to those in 2014. In reviewing the number of Heating Degree Days (HDD) and Cooling Degree Days (CDD) on the EnergyStar.gov website, the data indicates that the number of HDD in 2017 were lower than the HDD in 2014. Additionally, the data indicates that both HDD and CDD increased in 2018 from the 2017 figures and more closely resemble the data from 2014³. Although the increase in HDD and CDD provides an explanation for the increase in energy use and emissions, the weather normalized EUI value should have accounted for this discrepancy, yet the median EUI values across two sectors still showed an increase from 2017.

The Town should continue collecting and analyzing benchmarking data to better understand consumption trends in town owned facilities over time and to track progress towards its GHG reduction goals. The Town has proposed a Town facility GHG reduction goal of 20% by 2030 (over a 2014 baseline). Building energy benchmarking data provides a year-by-year progress indicator toward this goal, and sheds critical light on the relative contributions of existing buildings.

This year's annual benchmarking report and associated data can be found at the following link:

https://www.townofbrighton.org/DocumentCenter/View/9900/2018-Benchmarking-Report_Final

VII. Glossary & Acronyms

- **Cooling Degree Day:** The equivalent number of days you would have to cool your building by 1-degree Fahrenheit to accommodate the temperature requirement of 65-degrees Fahrenheit
- **Covered Municipal Building:** Building or facility owned or occupied by the Town of Brighton that is 1,000ft² or larger
- **DOE:** Department of Energy
- **EUI:** Energy use intensity
- **GHG:** Greenhouse Gas
- **Heating Degree Day:** The equivalent number of days you would have to heat your building by 1-degree Fahrenheit to accommodate the temperature requirement of 65-degrees Fahrenheit
- **kBTu:** 1000 British Thermal Units. Where 1 BTU is the amount of heat needed to raise one pound of water one degree Fahrenheit
- **MT CO_{2e}:** Metric tons carbon dioxide equivalent. Standard unit for measuring GHG emissions
- **NYC:** New York City
- **Weather Normalized Source:** The source energy use the property would have consumed during a 30-year average weather conditions



VIII. References

- 1 New York State Department of Environmental Conservation (NYSDEC). "Climate Action Plan Interim Report." (2010). Retrieved from: https://www.dec.ny.gov/docs/administration_pdf/irexecsumm.pdf
- 2 American Council for an Energy-Efficient Economy (ACEEE). "Multifamily benchmarking can save energy with the right support." (2017). Retrieved from: aceee.org/blog/2017/09/multifamily-benchmarking-can-save
- 3 Energy Star. "Degree Days Calculator." Retrieved from: <https://portfoliomanager.energystar.gov/pm/degreeDaysCalculator>