Sullivan County Greenhouse Gas Emissions Benchmarking Report 2019

Benchmarking helps the County measure our progress in improving energy efficiency, deploying renewable energy resources, reducing GHG emissions, and reducing energy costs in County facilities. For 2019, Sullivan County benchmarked 18 County owned or leased buildings that are larger than 1,000 square feet and use energy to heat or cool the occupied space, using the EPA's Portfolio Manager benchmarking software. The Plaza Drive Building was eliminated from the County's benchmarking protocol in 2019 because this facility is leased to another entity, and its hours of operation, occupancy, climate controls and equipment use are not controlled by the County.

The 2019 data on energy use, emissions and fuel use highlight changes in energy use and energy intensity relating to the number of cooling degree days (CDD) and heating degree days (HDD) compared to 2018; changes in building use; and quantifications affected by the timing of bulk fuel deliveries.

Cooling Degree Days (CDD) and Heating Degree Days (HDD) affect energy use and energy intensity. There were fewer CDD overall from May through October 2019 compared to 2018. July 2019 had the highest number of CDD in 2019, 210, which was an increase of 42 CDD over July 2018. CDD in July used more energy to condition the indoor spaces than CDD in other months because the temperature difference between the temperature set point of the building and the outdoor temperature was greater.

There were also more heating degree days (HDD) in 2019 than in 2018. Seven of the months in 2019 had more heating degree days that in 2018. Four months, May, June, August, and September recorded a higher monthly total of HDD in 2019 than in 2018.

Some buildings, like the Transportation Facility, experienced an increase in fuel use which is attributed to an expanded use of the facility due to the MOVE Sullivan initiative.

Other buildings saw expanded use as well, but showed a decrease in energy use in 2019 over 2018. For example, the Emergency Service Training Center (ESTC) saw an increase in the number of training classes and students over 2018, but achieved a decrease in energy use. That decrease is attributable to two prime causes, one involving building technology, and one focusing on the behavior of the building's occupants:

- In 2019, the facility's interior lights throughout the classrooms and offices were changed from fluorescent to LED; and
- In 2019, more attention was given to temperature set points including lowering the building temperature at night and weekends.

Another factor that has emerged is the timing of deliveries of bulk fuel such as #2 oil or propane, which affects calculations of site energy use and GHG emissions for some larger buildings as reflected in the benchmarking numbers. This is due to Portfolio Manager's convention of attributing consumption of bulk fuel to the month in which the fuel was delivered. For example, on December 21st 2018 the County's Maplewood Facility received a delivery of 10,002 gallons of propane. The next propane delivery at this facility occurred on March 7, 2019, in the amount of 10,001 gallons. Effectively, the first 60 days' propane consumption in 2019 was attributed to the 2018 calendar year, along with the energy use and GHG emissions footprint associated with that fuel. This interval varies depending on the exact timing of deliveries that occur near the end of one calendar year and the beginning of the following year.

In the fall of 2021, we anticipate producing a 5-year benchmarking report that we hope will provide a clearer picture of our overall progress in reducing energy use, EUI and GHG emissions for County facilities.

The 2019 data is shown in 3 tables that compare 2018 and 2019 data:

Table 1: Energy Performance
Table 2: Emissions Performance
Table 3: Fuel Performance

Energy Data Glossary

Btu: A British thermal unit (Btu) is a standard unit of energy, defined as the amount of heat needed to raise the temperature of one pound of water by one degree Fahrenheit. In tracking building energy use, the Btu provides a single unit of measure that allows us to analyze the efficiency of systems that use a variety of fuels.

Energy Star: ENERGY STAR is a U.S. Environmental Protection Agency voluntary program that helps businesses and individuals achieve superior energy efficiency. Energy Star building ratings are based upon 150 separate metrics such as each building's size, location, the number of occupants, number of computers, and other characteristics, 1 being the worst, 100 being the most efficient.

EUI: Energy Use Intensity (EUI) expresses a building's energy use as a function of its size and other characteristics. For most property types in Portfolio Manager, the EUI is expressed as energy per square foot per year. It is calculated by dividing the total energy consumed by the building in one year (measured in thousands of British thermal units or kBtu) by the total gross floor area of the building. In general, a low EUI signifies good energy performance. EUI can be calculated on site energy use or source energy use, as explained in the following glossary entries.

GHG (as measured in MTCO2e): There are a number of greenhouse gases (GHG), including carbon dioxide, methane, nitrous oxide and ozone. CO2 equivalent or CO2e, is a unit of measure that allows us to express the impact of each different GHG in terms of the amount of CO2 that would create the same amount of warming. CO2e allows us to express a carbon footprint consisting of different GHGs as a single, consistent number.

Heating and **Cooling Degree Days:** Degree days measure the amount of heating or cooling necessary at a given property. Degree days are measured relative to a base of 65°F. Above 65°F, it is assumed that the building will need to have cooling, and below 65°F it is assumed that the building will need to have heating. **Heating Degree Days (HDD)** are calculated based upon the number of days a building would have to be heated by 1 degree to accommodate the heating requirement. For example, on a day on which the temperature is 55°F degrees, that day is worth 10 Heating Degree Days because it is 10 degrees below 65°F. HDD is calculated in this way for each day of the year and summed up to get the total annual HDD. **Cooling Degree Days (CDD)** are calculated based upon the number of days a building would have to be cooled by 1 degree to accommodate the cooling requirement. For example, on a day on which the temperature is 80°F degrees, that day is worth 15 Cooling Degree Days because it is 15 degrees above 65°F. CDD is calculated in this way for each day of the year and summed up to get the total annual CDD.

Site Energy Use: Site Energy Use is the annual amount of all the energy a property consumes onsite, as reported on utility bills.

Site EUI: The Site Energy total for one year, as reflected in the building's energy bills, divided by the total square footage of the building, yields a number that represents Site Energy Use Intensity (Site EUI). Site EUI helps building managers understand how the energy use for an individual building changes over time.

Source Energy Use: Source Energy Use represents the total amount of raw fuel that is required to operate the building. It incorporates all production, transmission, delivery, storage, and transport losses for all fuel types. Source Energy Use is the basis for ENERGY STAR's rating system, which converts the consumption of each type of energy into a single common unit (kBtu) and expresses it as a score of 1-100, so that the energy performance of diverse buildings can be compared equitably.

Source EUI: The source energy use total for one year, divided by the total square footage of the building, yields a Source Energy Use Intensity (Source EUI) that provides the most comprehensive measure of a building's energy performance. By taking all energy use into account, the score provides a complete assessment of energy efficiency in a building.

Weather-normalized: Weather normalized metrics are adjusted to account for the actual weather in a given area, such as a hotter than usual summer or a colder than usual winter.

Table 1: Energy Performance

Energy Performance/Baseline										
Date Downloaded: 03/03/2021 01:15 PM EST										
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Number of properties in report: 18										
Comparing Year Ending: 12/2018 with 12/2019										
Property Name	**Site EUI (kBtu/ft²) Change**	**Source EUI (kBtu/ft²) Change**	**Weather Normalized Site EUI (kBtu/ft²) Change**	**Weather Normalized Source EUI (kBtu/ft²) Change**	**Site EUI - Adjusted to Current Year (kBtu/ft²) Change**	**Source EUI - Adjusted to Current Year (kBtu/ft²) Change**	**National Median Site EUI (kBtu/ft²) Change**	**National Median Source EUI (kBtu/ft²) Change**	**% Difference from National Median Source EUI Change**	
Sullivan County Government Center	11.4	13.7	9.1	11.8	11.6	14.2	4.8	-0.7	7.5	
Emergency Services Training Facility	0.2	4.9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	-4	0	4.5	
Transportation Facility	7.1	5.8	Not Applicable	Not Applicable	6.5	5.1	4.5	1.7	4.1	
Sullivan County Courthouse	5.4	1.1	6.3	3.1	5.8	2.2	3.3	-0.7	1.6	
Human Services Complex (Liberty)	-0.2	-3.6	-1.2	-6.3	Not Applicable	Not Applicable	0.8	0	-3.1	
Barryville Maintenance Shops	4.1	1.9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	2.2	0	2	
Callicoon Storm Station - RT. 97	-10.4	-22.4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	7.1	0	-25.1	
DPW Maplewood Facility	-41.7	-49.7	-43.4	-52.2	Not Applicable	Not Applicable	-4	0	-55.7	
Livingston Manor Storm Station	8	-8.4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	4.2	0	-9.4	
Sullivan County International Airport	7.6	7.6	6.8	7.2	Not Applicable	Not Applicable	4.4	0	6.8	
Landfill	0.4	-0.5	-1.3	-2.7	Not Applicable	Not Applicable	0.8	0	-0.5	
Rockland Transfer Station	1.2	3.3	-0.9	-2.5	Not Applicable	Not Applicable	0	0	3.6	
Ferndale Transfer Station	1.8	5.1	1.6	4.6	Not Applicable	Not Applicable	0	0	5.7	
Highland Transfer Station	-0.5	-1.2	-1.6	-4.5	Not Applicable	Not Applicable	0	0	-1.3	
Mamakating Transfer Station	1.9	5.6	1.3	3.6	Not Applicable	Not Applicable	0	0	6.2	
D&H Linear Park Museum Interpretive	0.7	2	1	2.6	Not Applicable	Not Applicable	-3.5	0	1.8	
Hurleyville Cultural Center	-2.7	-7.7	-3.6	-10	Not Applicable	Not Applicable	0	0	-6.8	
1909 Jail	-35.1	-34.2	-34.9	-33.6	Not Applicable	Not Applicable	-10	0	-21.9	

Table 2: Emissions Performance

Number of properties in report: 18
Comparing Year Ending: 12/2018 with 12/2019

Property Name	Indirect GHG Emissions (Metric Tons CO2e) Change	Direct GHG Emissions (Metric Tons CO2e) Change	Total GHG Emissions (Metric Tons CO2e) Change	Avoided Emissions - Onsite Green Power (Metric Tons CO2e) Change	Net Emissions (Metric Tons CO2e) Change
Sullivan County Government Center	4.8	84.6	89.4	0	89.4
Emergency Services Training Facility	0.9	-1.7	-0.7	0	-0.7
Transportation Facility	-0.3	5.4	5	0.7	5
Sullivan County Courthouse	-2.7	18.8	16.2	0	16.2
Human Services Complex (Liberty)	-10.9	22.3	11.4	1.7	11.4
Barryville Maintenance Shops	-1.1	10.5	9.3	0	9.3
Callicoon Storm Station - RT. 97	-1.4	-1.8	-3.3	0	-3.3
DPW Maplewood Facility	-6.8	-113.6	-120.5	0	-120.5
Livingston Manor Storm Station	-0.6	2.6	2	0	2
Sullivan County International Airport	0	34.3	34.3	0	34.3
Landfill	-1.1	3.5	2.4	0	2.4
Rockland Transfer Station	0.1	0	0.1	0	0.1
Ferndale Transfer Station	0.5	0	0.5	0	0.5
Highland Transfer Station	-0.1	0	-0.1	0	-0.1
Mamakating Transfer Station	0.3	0	0.3	0	0.3
D&H Linear Park Museum Interpretive	0.1	0	0.1	0	0.1
Hurleyville Cultural Center	-1.5	0	-1.5	0	-1.5
1909 Jail	1.4	-156.9	-155.4	0	-155.4

Table 3: Fuel Performance

Fuel Consumption

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Number of properties in report: 18

Comparing Year Ending: 12/2018 with 12/2019

Property Name	Site Energy Use (kBtu) Change	Energy Cost ($) Change	Electricity Use - Grid Purchase (kWh) Change	Electricity (Grid Purchase) Cost ($) Change	Fuel Oil #2 Use (kBtu) Change	Fuel Oil (No. 2) Cost ($) Change	Propane Use (kBtu) Change	Propane Cost ($) Change
Sullivan County Government Center	1282222.2	6627.62	41762.5	-9042.53	1139728.3	15670.14	Not Applicable	Not Applicable
Emergency Services Training Facility	1899.4	-1722.11	8244	-221.35	Not Applicable	Not Applicable	-26229.2	-1500.76
Transportation Facility	80459.1	-1584.02	-2593.2	-1370.79	Not Applicable	Not Applicable	83628	-213.24
Sullivan County Courthouse	175415.3	-1862.84	-23069.1	-5363.83	254127	3500.99	Not Applicable	Not Applicable
Human Services Complex (Liberty)	-34300.2	Not Applicable	-94728.6	Not Applicable	471132	1821.91	-196456.7	-10213.95
Barryville Maintenance Shops	109734.5	Not Applicable	-9826.5	-2949.99	124586.6	Not Applicable	18676	-443.33
Callicoon Storm Station - RT. 97	-67214	-1217.72	-12508.1	-689.52	-24536.4	-528.2	Not Applicable	Not Applicable
DPW Maplewood Facility	-1986948.5	Not Applicable	-59365	Not Applicable	101292.1	903.08	-1885687	-31407.14
Livingston Manor Storm Station	16625.7	-437.82	-5631	-691.88	35838.6	254.06	Not Applicable	Not Applicable
Sullivan County International Airport	484628.4	Not Applicable	-245.4	Not Applicable	316075.2	4704	169390.4	1536.94
Landfill	22388.7	-10535.65	-9150	-7007.49	Not Applicable	Not Applicable	53608.4	-3528.16
Rockland Transfer Station	1951.4	-146.35	571.9	-146.35	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ferndale Transfer Station	13204.2	52.12	3869.9	52.12	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Highland Transfer Station	-1621	-456.04	-475.1	-456.04	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mamakating Transfer Station	10054.8	749.3	2946.9	749.3	Not Applicable	Not Applicable	Not Applicable	Not Applicable
D&H Linear Park Museum Interpretive	2022.3	-134.81	509.1	-2.37	Not Applicable	Not Applicable	285.2	-132.44
Hurleyville Cultural Center	-44361.3	-1339.7	-13001.6	-1339.7	Not Applicable	Not Applicable	Not Applicable	Not Applicable
1909 Jail	-2072632.4	Not Applicable	12073.9	Not Applicable	-2113828.7	-34670.76	Not Applicable	Not Applicable