

## Sullivan County Greenhouse Gas Emissions Benchmarking Report 2018

Sullivan County continued to benchmark the 19 County owned or leased buildings that are larger than 1,000 square feet and use energy to heat or cool the occupied space. This information helps us measure our progress in improving energy efficiency, deploying renewable energy resources, reducing GHG emissions, and reducing energy costs in County facilities.

2018 data includes a full 12 months of energy data for the Government Center in Monticello, which reflect the complete energy retrofit at this facility. Elements of the retrofit include the installation of new heating and air conditioning systems (HVAC), building management controls, and LED lighting throughout the building and parking areas. The 2018 data shows reductions in electricity use, fuel use and site energy use intensity (EUI) over the 2016 baseline data as well as 2017 performance at the Government Center. The Energy Star rating for this building rose from 36 in 2016 and 40 in 2017 to 73 in 2018, a more than 100% improvement in overall energy performance over the baseline year. Site EUI was 107.8 in 2016, and dropped to 74.1 in 2018, a 31% improvement. Total GHG emissions intensity for the Government Center was 5.8 kgCO<sub>2</sub>e/square foot in the baseline year of 2016; that dropped to 4.2 kg CO<sub>2</sub>e/sf in 2018, a change of 27.6%. Site energy use dropped from 12,204,734.1 kBtu in 2016 to 8,389,333.9 in 2018, a 31.3% reduction in site energy use. Source EUI (measured in kBtu/sf) was 223.8 in 2016; it dropped 142.5 in 2018, a 36.3% improvement. In terms of energy costs, the retrofit reduced annual fuel oil use by 8,000 gallons at the Government Center, resulting in a cost savings of \$6,168.80 in 2018. Annual electricity use, measured in kilowatt hours (kWh), was reduced by 876,171.5 kWh over the baseline year and yielded a savings of \$67,606.90 in 2018. This reduction in electricity use resulted in additional annual savings of \$13,017.29 due to the reduction in monthly demand charges related to the building's electricity consumption. Total cost savings for all fuels was \$86,792.99.

Elevated source EUI continued to be a trend across all County facilities, driven by the increased number of heating degree days (HDD) and cooling degree days (CDD). There were 6,016 HDD in 2018 compared to 5,657 in 2017, an increase of 6.34%. There were 894 CDD in 2018 compared to 671 in 2017, an increase of 33.23%. The colder the outdoor air temperature, the more energy it takes to heat a building; the warmer the outdoor air temperature, the more energy it takes to cool the building. The impact of increased cooling degree days is felt across all County buildings that are occupied space. Increased heating degree days have the most impact at facilities that are electrically heated using older technology.

Energy use intensity at the Sullivan County Emergency Services Training Facility and Emergency Operations Center decreased even with EOC operations during two prolonged storms in March and May 2018.

The 2018 data is shown in 3 tables that compare 2017 and 2018 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 MTCO<sub>2</sub>e): There are a number of greenhouse gases (GHG), including carbon dioxide, methane, nitrous oxide and ozone. CO<sub>2</sub> equivalent or CO<sub>2</sub>e, is a unit of measure that allows us to express the impact of each different GHG in terms of the amount of CO<sub>2</sub> that would create the same amount of warming. CO<sub>2</sub>e 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

Date Downloaded: 10/28/2019 02:21 PM EDT

Date Generated: 10/28/2019 10:47 AM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2017 with 12/2018

Property Name	Site EUI (kBtu/ft <sup>2</sup> ) Change	Source EUI (kBtu/ft <sup>2</sup> ) Change	Weather Normalized Site EUI (kBtu/ft <sup>2</sup> ) Change	Weather Normalized Source EUI (kBtu/ft <sup>2</sup> ) Change	Site EUI - Adjusted to Current Year (kBtu/ft <sup>2</sup> ) Change	Source EUI - Adjusted to Current Year (kBtu/ft <sup>2</sup> ) Change	National Median Site EUI (kBtu/ft <sup>2</sup> ) Change	National Median Source EUI (kBtu/ft <sup>2</sup> ) Change	% Difference from National Median Source EUI Change
Sullivan County Government Center	-21	-47.3	-17.9	-42.9	-22.3	-50	5	2.6	-26
Emergency Services Training Facility	6.6	4.9	Not Applicable	Not Applicable	Not Applicable	Not Applicable	5.7	0	4.4
Transportation Facility	-1	1.9	-4.4	-1.5	-2.6	0	-1.7	2.1	0.3
Sullivan County Courthouse	-4.9	-1.2	-6.3	-4.9	-6.8	-5.1	-2.1	2.5	-3.6
Human Services Complex (Liberty)	-4	-17.3	-4.3	-18.3	Not Applicable	Not Applicable	1.9	0	-14.8
Barryville Maintenance Shops	10.8	10	Not Applicable	Not Applicable	Not Applicable	Not Applicable	3.5	0	10.3
Callicoon Storm Station RT. 97	13.6	15.3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	4.8	0	17.2
DPW Maplewood Facility	58	56.6	55.9	52.6	Not Applicable	Not Applicable	12.6	0	63.5
Livingston Manor Storm Station	-1.5	-18.4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	2.3	0	-20.6
Sullivan County International Airport	-1.1	3.6	-1.5	1.8	Not Applicable	Not Applicable	-3.2	0	3.2
Landfill	-1.5	-1.1	-4	-4	Not Applicable	Not Applicable	-0.9	0	-1.3
Rockland Transfer Station	-7.6	-21.3	-9	-25.5	Not Applicable	Not Applicable	0	0	-23.8
Ferndale Transfer Station	0.3	0.8	-0.4	-1.2	Not Applicable	Not Applicable	0	0	0.9
Highland Transfer Station	-0.8	-2.2	-1.9	-5.2	Not Applicable	Not Applicable	0	0	-2.5
Mamakating Transfer Station	-0.3	-0.9	-1.3	-3.7	Not Applicable	Not Applicable	0	0	-1
D&H Linear Park Museum Interpretive	3.6	3.8	3.3	3.1	Not Applicable	Not Applicable	1.9	0	3.4
Hurleyville Cultural Center	3.9	10.8	1.3	3.6	Not Applicable	Not Applicable	0	0	9.6
Plaza Drive Building (leased)	-12.2	-18.4	-12.1	-17.9	Not Applicable	Not Applicable	7	0	-20.6
1909 Jail	18.6	19.7	17.5	16.5	Not Applicable	Not Applicable	5	0	12.6

## Table 2: Emissions Performance

### Emissions Performance

Date Downloaded: 10/28/2019 10:42 AM EDT

Date Generated: 10/24/2019 03:24 PM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2017 with 12/2018

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 and Offsite Green Power (Metric Tons CO2e) Change	Net Emissions (Metric Tons CO2e) Change
Sullivan County Government Center	-65	-53.6	-118.5	0	-118.5
Emergency Services Training Facility	-0.4	5.1	4.8	0	4.8
Transportation Facility	0.8	-1.9	-1.1	-0.3	-1.1
Sullivan County Courthouse	2.7	-17.1	-14.4	0	-14.4
Human Services Complex (Liberty)	-50.9	38.9	-12	-60.4	45.8
Barryville Maintenance Shops	-0.5	21.6	21.1	0	21.1
Callicoon Storm Station RT. 97	0.3	6.1	6.3	-1.4	7.8
DPW Maplewood Facility	-2.1	182.7	180.8	0	180.8
Livingston Manor Storm Station	-0.8	1.3	0.5	0	0.5
Sullivan County International Airport	6.5	-15.8	-9.3	-15.1	5.8
Landfill	0.5	-7.6	-7	0	-7
Rockland Transfer Station	-0.5	0	-0.5	0	-0.5
Ferndale Transfer Station	0.1	0	0.1	0	0.1
Highland Transfer Station	-0.1	0	-0.1	0	-0.1
Mamakating Transfer Station	-0.1	0	-0.1	0	-0.1
D&H Linear Park Museum Interpretive	0	0.5	0.6	0	0.6
Hurleyville Cultural Center	2.5	0	2.5	0	2.5
Plaza Drive Building (leased)	-2.6	-11.3	-13.9	0	-13.9
1909 Jail	1.2	79.1	80.3	-2.1	82.4

### Table 3: Fuel Performance

**Fuel Performance**

Date Downloaded: 10/28/2019 10:49 AM EDT

Date Generated: 10/28/2019 10:42 AM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2017 with 12/2018

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	-2372818.9	-63905.71	-483879.2	-66277.77	-721822.9	2372.06	Not Applicable	Not Applicable
Emergency Services Training Facility	69736	5065.31	-3103.5	2704.21	Not Applicable	Not Applicable	80325.2	2361.1
Transportation Facility	-11526.4	2192.42	5526.9	1282.7	Not Applicable	Not Applicable	-28225.6	909.73
Sullivan County Courthouse	-161295.4	14876.43	20307.4	15882.5	-230584.2	-1006.07	Not Applicable	Not Applicable
Human Services Complex (Liberty)	-691024.2	Not Applicable	-379600	Not Applicable	-113546.3	6154.61	736874	17218.51
Barryville Maintenance Shops	287165.3	15562.22	-4052.3	6532.67	228734.9	7514.83	72256.8	1514.72
Callicoon Storm Station - RT. 97	87679.4	2137.16	1684.8	282.34	81930.6	1854.82	Not Applicable	Not Applicable
DPW Maplewood Facility	2764526.6	55255.59	-15098.3	12654.14	184271.4	5128.63	2631770.4	37472.82
Livingston Manor Storm Station	-3035	1791.08	-5844	1188.94	16905	602.14	Not Applicable	Not Applicable
Sullivan County International Airport	-66875	Not Applicable	48329.7	Not Applicable	-92225.4	-430.03	-139550.5	-1534.39
Landfill	-105033.7	20038.33	3918.6	17448.07	Not Applicable	Not Applicable	-118404	2590.26
Rockland Transfer Station	-12787.6	834.42	-3747.8	834.42	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ferndale Transfer Station	1922.3	1098.57	563.4	1098.57	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Highland Transfer Station	-3078	2132.08	-902.1	2132.08	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mamakating Transfer Station	-1621.7	-1293.65	-475.3	-1293.65	Not Applicable	Not Applicable	Not Applicable	Not Applicable
D&H Linear Park Museum Interpretive	9061.5	263.69	121.2	26.43	Not Applicable	Not Applicable	8648	237.26
Hurleyville Cultural Center	62624.5	8466.56	18354.2	8466.56	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Plaza Drive Building (leased)	-243581	-77.02	-19888.9	-1768.6	Not Applicable	Not Applicable	-175720	1691.58
1909 Jail	1095966.5	58598.34	8735.7	27574.76	1066160.4	31023.58	Not Applicable	Not Applicable