

# Sullivan County Greenhouse Gas Emissions Benchmarking Report 2021

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 2021, Sullivan County benchmarked 19 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. Unless otherwise noted, the County uses benchmarking data from 2016 as the baseline year against which year-to-year changes in energy use and GHG emissions are measured.

Highlights of the 2021 data on energy use, emissions and fuel use include energy savings related to energy retrofits at the Sullivan County Courthouse and Government Center Annex in Monticello, and the Shared Health Clinic in Liberty. In 2021, the County retired the old 1909 County Jail, which is no longer occupied, conditioned space; the 1909 County Jail has been removed from the County’s inventory of benchmarked buildings. For 2021, a full year of data is now available for the Sullivan County District Attorney’s office at 26 Hamilton Avenue in Monticello.

Energy costs were significantly affected by the cost of fuel oil, which rose from \$1.59/gallon in January 2021 to \$2.40/gallon in November 2021. Energy use and energy costs were also affected by the number of cooling degree days (CDD) and heating degree days (HDD) compared to 2020.

## LED Lighting at the SC International Airport and other County facilities

Through a program provided by the New York Power Authority, Sullivan County launched a project to upgrade County-owned streetlights at the Sullivan County International Airport, Health and Human Services Complex, and County Courthouse to energy efficient LED lighting, and aggregated the cost of new fixtures in partnership with three participating towns: Thompson, Tusten and Fallsburg. The County expects to save 60-70% on monthly electric bills attributable to reduced electric consumption as well as reduced maintenance costs. The replacement schedule covers 25 (100% of the County’s streetlights). Old lamps that were replaced with LEDs include high pressure sodium, metal halide and mercury vapor lamps. In addition to cost savings, the lighting upgrades provided improved illumination and controls.

While we have only partial data, since the project was completed in 2022, we can project substantial energy cost savings from this initiative. For example, at the SC International Airport, 19 high intensity discharge (HID) fixtures were replaced with LED instruments in 2021. Electric use for streetlighting was reduced from 3,097 kWh in December 2020 to 1,506 kWh in December 2021.

Sullivan County International Airport Streetlight Replacement Details		
5 250W mercury vapor lights	Replaced with	5 45W LEDs
6 400W mercury vapor lights		6 161W LEDs
1 150W high pressure sodium light		1 38W LED
2 400W high pressure sodium lights		2 108W LEDs
5 250W high pressure sodium lights		5 45W LEDs

Note: Streetlights are not separately metered by the electric utility. Streetlights are equipped with a photo sensor that detects sunrise and sunset to activate and deactivate the lamp, and the timing and length of time the lamp is illuminated changes with the seasons. We use a standard calculation developed by the electric utilities, based upon the rated electric demand for each type of fixture and the seasonally adjusted start/stop timing (hours in use) for our latitude to calculate electricity use for each streetlight.

### **Many factors influence overall building performance**

Benchmarking of County buildings demonstrates that energy and GHG data are complex and mutable. Energy savings may vary year to year due to variations in the number of Heating Degree Days and Cooling Degree Days. There were 110 fewer Cooling Degree Days (CDD) in 2021 compared to 2020, and 40 more Heating Degree Days (HDD). Other factors include changes in building use and the addition or elimination of buildings in the County's portfolio. Aggregated GHG emissions, along with Energy Use Intensity and other indicators can vary in alignment with these factors. Even the timing of fuel deliveries at an individual facility can skew the annual average. For example, in 2020 a large fuel delivery for the backup generator at the County's Public Safety Campus was automatically "booked" in the Portfolio Manager software as consumed in 2020, which made the building's energy and GHG performance appear worse than it was. The 2021 data give a more accurate picture of actual energy consumption and GHG emissions at the Public Safety Campus.

Similarly, cost savings can be uneven year-to-year due to the volatility of fuel prices. As noted earlier in this report, the cost of fuel oil rose from \$1.59/gallon in January 2021 to \$2.40/gallon in November 2021. As a result, buildings that rely on fuel oil may show improved energy performance due to efficiency measures, but higher energy costs due to fuel price volatility. One cost constant is the renewable electricity purchased at a fixed cost through our PPA at the Liberty campus. As we work through the County's building inventory and achieve reductions in electricity demand through energy retrofits, the electricity we purchase through the PPA is distributed to additional buildings, spreading the GHG benefits of our renewable energy purchase.

The 2021 data is shown in 3 tables that compare 2020 and 2021 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

Number of properties in report: 19

Comparing Year Ending: 12/2020 with 12/2021

### Site EUI and GHG Emissions

Date Downloaded: 07/28/2022 01:37 PM EDT

Date Generated: 05/12/2022 02:42 PM EDT

Number of properties in report: 18

Comparing Year Ending: 12/2020 with 12/2021

Property Name	Cooling Degree Days (CDD) (°F) Change	Heating Degree Days (HDD) (°F) Change	Site EUI (kBtu/ft²) Change	Site Energy Use (kBtu) Change	National Median Site Energy Use (kBtu) Change	National Median Site EUI (kBtu/ft²) Change	Total GHG Emissions (Metric Tons CO2e) Change	Total GHG Emissions Intensity (kgCO2e/ft²) Change
Sullivan County Government Center	-111	40	2.9	331353.2	-170337.5	-1.5	13.7	0.1
Emergency Services Training Facility	-111	40	2.1	22407.7	1211.6	0.1	1.1	0.1
Transportation Facility	-111	40	34.5	393632	143333	12.6	26.4	2.3
Sullivan County Courthouse	-111	40	-12.9	-420737.3	-33645.3	-1	-21.2	-0.7
Human Services Complex (Liberty)	-111	40	-0.1	-18421.1	183169.4	1	14	0.1
Barryville Maintenance Shops	-111	40	-34.8	-925446.4	-154897.2	-5.8	-64.2	-2.4
Callicoon Storm Station RT. 97	-111	40	-3.9	-25143.1	45212.1	7	-0.1	0
DPW Maplewood Facility	-111	40	3.6	171211.4	70103.5	1.5	14.3	0.3
Livingston Manor Storm Station	-111	40	14.4	30214.5	-16252.9	-7.7	-0.8	-0.3
Sullivan County International Airport	-111	40	0.4	30478.8	-37843.2	-0.6	1.4	0
Landfill	-111	40	-2.2	-154513.6	-74991.6	-1.1	-9.6	-0.1
Rockland Transfer Station	-111	40	-1.3	-2275.8	0	0	0	0
Ferndale Transfer Station	-111	40	-2.6	-18699	0	0	-0.6	-0.1
Highland Transfer Station	-111	40	-8.8	-33885.2	0	0	-1	-0.2
Mamakating Transfer Station	-111	40	-0.4	-1927.4	0	0	-0.1	0
D&H Linear Park Museum Interpretive	-111	40	-8.8	-22516	-64647.7	-25.3	-1.6	-0.7
Hurleyville Cultural Center	-111	40	3.5	57392.9	0	0	1.8	0.1
Sullivan County Public Safety	-111	40	-9	-1387449.6	-939922.9	-6.1	-106	-0.7

## Table 2: Emissions Performance

Number of properties in report: 19

Comparing Year Ending: 12/2020 with 12/2021

### GHG Emissions

Date Downloaded: 05/12/2022 01:40 PM EDT

Date Generated: 05/11/2022 03:07 PM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2020 with 12/2021

Property Name	Total GHG Emissions (Metric Tons CO2e) Change	Direct GHG Emissions (Metric Tons CO2e) Change	Indirect 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	13.7	6	7.7	0	13.7
Emergency Services Training Facility	1.1	0.8	0.3	0	1.1
Transportation Facility	26.4	26.9	-0.5	-0.6	26.1
Sullivan County Courthouse	-21.2	-13.9	-7.2	0	-21.2
Human Services Complex (Liberty)	14	26.1	-12.2	-55.6	72.2
Barryville Maintenance Shops	-64.2	-61.5	-2.8	0	-64.2
Callicoon Storm Station - RT. 97	-0.1	1.2	-1.3	9.5	-9.6
DPW Maplewood Facility	14.3	15.3	-1	0	14.3
Livingston Manor Storm Station	-0.8	-2.9	2.1	11.4	-12.2
Sullivan County International Airport	1.4	-0.4	1.7	28.4	-27
Landfill	-9.6	-9.2	-0.4	0	-9.6
Rockland Transfer Station	0	0	0	0	0
Ferndale Transfer Station	-0.6	0	-0.6	0	-0.6
Highland Transfer Station	-1	0	-1	0	-1
Mamakating Transfer Station	-0.1	0	-0.1	0	-0.1
D&H Linear Park Museum Interpretive	-1.6	-1.9	0.2	0	-1.6
Hurleyville Cultural Center	1.8	0	1.8	0	1.8
Sullivan County Public Safety	-106	-121.9	15.7	0	-106
Sullivan County District Attorney	-4.3	-5.9	1.6	0	-4.3
	-136.8	-141.3	4	-6.9	-128.2



### Table 3: Fuel Performance

Number of properties in report: 19  
 Comparing Year Ending: 12/2020 with 12/2021

Date Downloaded: 07/27/2022 09:33 AM EDT  
 Date Generated: 07/20/2022 04:16 PM EDT  
 Number of properties in report: 19  
 Comparing Year Ending: 12/2020 with 12/2021

Property Name	Site Energy Use (kBtu) Change	Energy Cost (\$) Change	Energy Cost Intensity (\$/ft²) 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	331353.2	26861.06	0.23	73453.4	5253.01	80730.1	21608.05	Not Applicable	Not Applicable
Emergency Services Training Facility	22407.7	2973.13	0.29	2512	316.06	Not Applicable	Not Applicable	13836.8	2657.07
Transportation Facility	393632	11075.67	0.98	-5241	540.8	Not Applicable	Not Applicable	418876	10534.87
Sullivan County Courthouse	-420737.3	-4150.83	-0.21	-68062.5	245.22	-188508	603.95	Not Applicable	Not Applicable
Human Services Complex (Liberty)	-18421.1	57163.14	4	-115194.7	22143.74	350368.6	21191.52	1739	14007.25
Barryville Maintenance Shops	-925446.4	-12224.22	-0.46	-25693.6	-6019.93	-769212.1	-6760.37	-68567.6	556.08
Callicoon Storm Station - RT. 97	-25143.1	509.57	0.08	-12465.2	-381.06	17388	890.63	Not Applicable	Not Applicable
DPW Maplewood Facility	171211.4	18475.22	0.38	-9531.8	3707.11	218730	5987.41	-14996.2	8780.7
Livingston Manor Storm Station	30214.5	-20.25	-0.01	20382.3	302.97	-39330	-323.22	Not Applicable	Not Applicable
Sullivan County International Airport	30478.8	-5551.29	-0.04	16617.5	Not Applicable	134964	5232.13	-161184	-298.98
Landfill	-154513.6	6954.97	0.11	-3356.8	Not Applicable	Not Applicable	Not Applicable	-143060.1	7822.72
Rockland Transfer Station	-2275.8	263.05	0.15	-667.1	263.05	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ferndale Transfer Station	-18699	-360.27	-0.05	-5480.4	-360.27	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Highland Transfer Station	-33885.2	-93.44	-0.02	-9931.2	-93.44	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mamakating Transfer Station	-1951	2500.9	0.5	-571.8	2500.9	Not Applicable	Not Applicable	Not Applicable	Not Applicable
D&H Linear Park Museum Interpretive	-22516	-122.4	-0.04	1921.5	Not Applicable	Not Applicable	Not Applicable	-29072	-226.89
Hurleyville Cultural Center	57392.9	4239.14	0.27	16820.9	4239.14	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sullivan County Public Safety	-1444067.2	91326.35	0.59	132543.1	53971.27	Not Applicable	Not Applicable	-1896304.2	37355.08
Sullivan County District Attorney	-25342	1951.35	0.19	16031	Not Applicable	-80040	1014.86	Not Applicable	Not Applicable

-2056307.2      201770.85      6.94      24085.6      86628.57      -274909.4      49444.96      -1878732.3      81187.9