

Sullivan County Greenhouse Gas Emissions Benchmarking Report 2023

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 2023, Sullivan County benchmarked 19 County owned 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. For buildings that were constructed or acquired after 2016, the baseline year starts one full year after the date of the building's full occupancy by the County.

Energy Performance

Sullivan County facilities that have undergone systematic energy efficiency retrofits guided by energy audits continue to perform well with respect to overall energy consumption and operational efficiency.

Emissions Performance

The County realized 2,197,004 kWh from hydropower in the twelve months' production from the County's operating agreement with Gravity Renewables to purchase electricity per year from a small hydro-electric plant in upstate NY. The SC Government Center and Annex, the new Public Safety Complex (SC Jail, Sheriffs and Road Patrol) and the SC Courthouse receive the monetary benefit of the operating agreement and the County owns the renewable energy credits from this hydroelectric plant. The renewable energy attributes of this generation offset 100% of the Greenhouse Gas (GHG) emissions for the electricity used by these buildings in 2023.

Total avoided GHG emissions county-wide from on-site and offsite renewables in 2023 = 4712.5 MTCO₂e.

The change-over from oil heating to air source heat pumps (ASHP) at the SC District Attorney's offices continues to reduce emissions, overall Site Energy Use and Site Use Intensity at this facility. The change-over reduced fuel oil use by 16,422 kBtu (419 gallons of #2 fuel oil), while electricity use dropped by 5,962 kWh. Direct GHG emissions were reduced by 5 metric tons of CO₂e. Overall, Site Energy Use decreased by 36,764.4 kBtu, which reduced Site Use Intensity (SUI) by 3.67 kBtu per square foot at the District Attorney's offices.

Heating and Cooling Degree Days in 2023

Energy consumption and cost savings may vary year to year due to variations in the number of Cooling Degree Days (CDD) and Heating Degree Days (HDD). In 2023, there were 231 fewer CDD than in 2022, and 603 fewer HDD.

Other factors that influence overall building performance

Benchmarking of County buildings demonstrates that energy and GHG data are complex and mutable. In addition to variance in the number of CDD and HDD, year-end fuel deliveries at individual facilities can skew the annual average, since Portfolio Manager automatically books fuel as "consumed" in the year it was delivered. When benchmarking includes efforts to account for the timing of fuel consumption as opposed to the date of delivery, a more accurate annual fuel consumption analysis is possible. For example, the documented consumption of fuel oil at the Government Center in Monticello was reduced by 1,309,799 kBtu (9,431 gallons) in 2023 due to more accurate accounting for timing of consumption. The County could address this problem further by installing meters at the three County facilities that receive large bulk purchases of fuel oil. This would also allow monthly readings of fuel consumption which would facilitate more granular data on weather normalized fuel consumption.

Snapshot: Energy Cost Intensity at Two County Facilities

The 2023 data is shown in 3 tables that compare 2022 and 2023 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 mean 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 mean 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. [Mean temperature = (high temperature of a particular day + low temperature of that day) ÷ 2.]

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 2023

Date Downloaded: 08/07/2024 10:53 AM EDT

Date Generated: 08/06/2024 03:00 PM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2022 with 12/2023

"Not Available" indicates that a fuel source or energy technology is not used at a specific building.

Property Name	Site EUI Change (kBtu/ft ²)	Source EUI Change (kBtu/ft ²)	National Median Site EUI Change (kBtu/ft ²)	National Median Source EUI Change (kBtu/ft ²)	Electricity Use - Grid Purchase Change (kBtu)	Electricity Use – Generated from Onsite Renewable Systems and Used Onsite Change (kBtu)	Fuel Oil #2 Use Change (kBtu)	Propane Use Change (kBtu)	Green Power - Onsite and Offsite Change (kWh)	Avoided Emissions - Onsite and Offsite Green Power Change (Metric Tons CO2e)
Sullivan County Government Center	0.4	-7.6	3.8	-3.9	-499674.9	Not Available	537827.6	Not Available	191997.4	-266.7
Emergency Services Training Facility	-11.5	-12.3	-5.2	0	-3398.5	Not Available	Not Available	-117741.6	0	0
Transportation Facility	1.4	-1.7	-1.9	-6.8	-19507.8	1960	Not Available	33764	-7977.1	-3.2
Sullivan County Courthouse	-5.5	-4.1	-4.7	-4	26859.2	Not Available	-206862	Not Available	247160	309.7
Human Services Complex (Liberty)	-2	-5.7	0.4	0	-357856.4	121204.5	-508971.6	401855.8	165116	179.7
Barryville Maintenance Shops	-44.3	-49.2	-8.1	0	-65472.7	Not Available	-1017656.4	-96241.2	0	0
Callicoon Storm Station - RT. 97	6	39.2	-12.8	0	119119.7	Not Available	-80316	Not Available	34912	14
DPW Maplewood Facility	-30.4	-33.8	-7.8	0	-85017.6	Not Available	481206	-1842760.1	0	0
Livingston Manor Storm Station	-28.2	-41.8	-3.4	0	-15528.4	Not Available	-43884	Not Available	-4551.2	-1.8
Sullivan County International Airport	-14.3	-18.3	-6.3	0	-140517.2	Not Available	-405858	-372416	-31585.3	-12.7
Landfill	-9.6	-11.6	-4.7	0	-78305.3	Not Available	Not Available	-605636	0	0
Rockland Transfer Station	-7.4	-20.5	0	0	-12339.4	Not Available	Not Available	Not Available	0	0
Ferndale Transfer Station	1.8	4.9	0	0	12692.6	Not Available	Not Available	Not Available	0	0
Highland Transfer Station	-4.8	-13.3	0	0	-18275.6	Not Available	Not Available	Not Available	0	0
Mamakating Transfer Station	-4.8	-13.4	0	0	-24174	Not Available	Not Available	Not Available	0	0
D&H Linear Park Museum Interpretive Center	3.8	3.8	3.9	0	-54.1	Not Available	Not Available	9844	0	0
Hurleyville Cultural Center	1.7	4.9	0	0	28650.5	Not Available	Not Available	Not Available	0	0
Sullivan County Public Safety	-3.6	1.4	-3.7	0	433156.9	Not Available	Not Available	-993140.1	986110	1389.6
Sullivan County District Attorney	-3.7	-7.4	-1.6	-4	-20342.3	Not Available	-16422	Not Available	0	0

Table 2: Emissions Performance 2023

Date Downloaded: 07/24/2024 10:54 AM EDT

Date Generated: 07/24/2024 10:49 AM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2022 with 12/2023

"0" indicates that a particular technology and/or energy procurement mechanism is not available.

Property Name	Total (Location-Based) GHG Emissions Change (Metric Tons CO2e)	Direct GHG Emissions Change (Metric Tons CO2e)	Indirect (Location-Based) GHG Emissions Change (Metric Tons CO2e)	Avoided Emissions - Onsite Green Power Change (Metric Tons CO2e)	Avoided Emissions - Offsite Green Power Change (Metric Tons CO2e)
Sullivan County Government Center	24.4	39.9	-15.6	0	-310.2
Emergency Services Training Facility	-7.7	-7.6	-0.1	0	0
Transportation Facility	1.5	2.1	-0.6	0.3	-3.4
Sullivan County Courthouse	-14.5	-15.3	0.8	0	309.7
Human Services Complex (Liberty)	-23.1	-12	-11.1	14.3	165.4
Barryville Maintenance Shops	-83.7	-81.7	-2.1	0	0
Callicoon Storm Station - RT. 97	-2.3	-5.9	3.7	0	14
DPW Maplewood Facility	-85.3	-82.7	-2.6	0	0
Livingston Manor Storm Station	-3.8	-3.2	-0.5	0	-1.8
Sullivan County International Airport	-58.4	-54.1	-4.3	0	-12.7
Landfill	-41.3	-38.9	-2.5	0	0
Rockland Transfer Station	-0.4	0	-0.4	0	0
Ferndale Transfer Station	0.4	0	0.4	0	0
Highland Transfer Station	-0.6	0	-0.6	0	0
Mamakating Transfer Station	-0.8	0	-0.8	0	0
D&H Museum Interpretive Center	0.6	0.7	0	0	0
Hurleyville Cultural Center	0.9	0	0.9	0	0
Sullivan County Public Safety	-50.3	-63.8	13.5	0	1389.6
Sullivan County District Attorney	-1.9	-1.2	0	0	0

Table 3: Fuel Performance 2023

Date Downloaded: 07/30/2024 12:22 PM EDT

Date Generated: 07/30/2024 12:14 PM EDT

Number of properties in report: 19

Comparing Year Ending: 12/2022 with 12/2023

"Not Available " indicates that a fuel source is not used at a particular facility.

Property Name	Electricity Use - Grid Purchase Change (kWh)	Fuel Oil #2 Use Change (kBtu)	Propane Use Change (kBtu)	Site Energy Use Change (kBtu)	Fuel Oil (No. 2) Cost Change (\$)	Propane Cost Change (\$)	Electricity (Grid Purchase) Cost Change (\$)	Energy Cost Intensity Change (\$/ft²)	Energy Cost Change (\$)
Sullivan County Government Center	-146446.3	537827.6	Not Available	38152.7	-13105.88	Not Available	-43212.79	-0.5	-56318.68
Emergency Services Training Facility	-996.1	Not Available	-117741.6	-121140.1	Not Available	-3490.11	-1394.07	-0.47	-4884.18
Transportation Facility	-5717.4	Not Available	33764	16216.2	Not Available	-2471.83	-1441.98	-0.34	-3913.8
Sullivan County Courthouse	7872	-206862	Not Available	-180002.8	-8073.87	Not Available	-10236.05	-0.56	-18309.92
Human Services Complex (Liberty)	-104881.7	-508971.6	401855.8	-343767.7	-36425.52	382.47	-57,592.96	-0.54	-93,635.92
Barryville Maintenance Shops	-19189	-1017656.4	-96241.2	-1179370.3	-25377.12	-2569.15	-3787.67	-1.2	-31,733.95
Callicoon Storm Station - RT. 97	34912	-80316	Not Available	38803.7	-2337.4	Not Available	1237.88	-0.17	-1099.52
DPW Maplewood Facility	-24917.2	481206	-1842760.1	-1446571.7	10991.82	-32119.91	-5703.93	-0.56	-26832.02
Livingston Manor Storm Station	-4551.2	-43884	Not Available	-59412.4	-684.34	Not Available	-701.83	-0.66	-1386.17
Sullivan County International Airport	-41183.3	-405858	-372416	-918791.2	-12080.22	-20445.27	-3346.4	-0.56	-35871.89
Landfill	-22950	Not Available	-605636	-683941.3	Not Available	-15925.24	-2682.14	-0.26	-18,607.41
Rockland Transfer Station	-3616.5	Not Available	Not Available	-12339.4	Not Available	Not Available	-711.08	-0.42	-711.08
Ferndale Transfer Station	3720	Not Available	Not Available	12692.6	Not Available	Not Available	-100.31	-0.01	-100.31
Highland Transfer Station	-5356.3	Not Available	Not Available	-18275.6	Not Available	Not Available	-1547.59	-0.4	-1547.59
Mamakating Transfer Station	-7085	Not Available	Not Available	-24174	Not Available	Not Available	-1228.94	-0.25	-1228.94
D&H Linear Park Museum Interpretive Center	-15.9	Not Available	9844	9789.9	Not Available	29.28	-176.11	-0.05	-146.83
Hurleyville Cultural Center	8397	Not Available	Not Available	28650.5	Not Available	Not Available	-7609.14	-0.47	-7609.14
Sullivan County Public Safety	126951	Not Available	-993140.1	-559983.2	Not Available	-59091.98	-35261.39	-0.61	-94353.36
Sullivan County District Attorney	-5962	-16422	Not Available	-36764.4	-1252.11	Not Available	-4402.47	-0.56	-5654.58

