

## Sullivan County Greenhouse Gas Emissions Benchmarking Report 2020

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 2020, 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. 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.

### **Changes in building use from 2019**

For 2020, we have for the first time a full 12-months of energy use data for the County's new Public Safety Facility located at 58 Old Route 17 in Monticello. This facility replaced the old 1909 County Jail, and also incorporates the offices of the Sullivan County Sheriff, the Patrol Division and the Civil Division. We have produced a special supplemental report highlighting the energy performance of the new facility. As some allied offices were still transitioning from the old jail location in 2020, data for the old jail is still included in the 2020 benchmarking report.

Similarly, 2020 marked the first full year that the Office of the Sullivan County District Attorney occupied new offices at 26 Hamilton Avenue in Monticello; 2020 will be the baseline data year for this facility.

### **Impact of the COVID-19 pandemic on building energy performance, energy use and GHG emissions**

Direct, indirect and total greenhouse gas emissions (GHG) for County operations fell during 2020, as would be expected for operations in a pandemic. With the exception of essential services and public safety, staffing levels at County facilities were affected from mid-March 2020 through the end of the year as the County took action to reduce the number of employees working onsite at County facilities at any given time. While the heating and cooling of occupied buildings was maintained at pre-pandemic levels, work from home arrangements affected the number of computers in use on a day-to-day basis. The only observed exception was the Barryville Maintenance Shops, which showed an increase across all three sectors of GHG emissions. A closer analysis of fuel deliveries at this location showed that an early December propane delivery was made after the propane deliveries were changed from "will call" to automatic delivery. Under the "will call" protocol, the December 2020 delivery would have been called for in January 2021. When that December delivery was factored out of 2020 and put into 2021, the fuel use at the Barryville Shops was consistent with its historical annual use.

### **CDD and HDD had less impact in 2020**

We can often explain increases in building energy use from year to year by looking at heating and cooling degree days. This does not appear to be significant in the comparison of baseline and 2020 data. The Binghamton data region registered 6,703 heating degree days in 2016 and 6,653 in 2020. Cooling degrees were registered at 555 for both the baseline year of 2016 and for 2020.

The 2020 data is shown in 3 tables that compare 2019 and 2020 data:

**Table 1: Energy Performance**

**Table 2: Emissions Performance**

**Table 3: Fuel Performance**

## **Highlights of 5 Years of Benchmarking Data**

At the five year mark from the County's baseline benchmarking year of 2016, our efforts have yielded valuable information about effective strategies for reducing GHG emissions from County operations and the associated energy costs. The County's building inventory varies widely in terms of the age and size of individual buildings. For example, the Bushnell Building, which until recently housed the Sheriff's Patrol Unit, was built in 1890, and the Aircraft Rescue and Fire Fighting Facility and Offices at the Sullivan County International Airport was built in 2012. The smallest occupied building is the Scale House at the County Landfill, which totals 1,056 square feet; the largest facility included in the full five years of this benchmarking report is the Government Center, at 89,400 square feet.

Over the past five years, we have had the opportunity to see how a modern, code compliant building in the County compares with a national standard, how a poorly performing building was able to reduce its energy consumption through a major heating and cooling system (HVAC) and lighting retrofit, and how a Power Purchase Agreement (PPA) of electricity from a photovoltaic system built on County property has reduced operating emissions at the Human Services Complex in Liberty.

### **Government Center energy retrofit continues to deliver energy savings and GHG reductions**

In 2013, the County engaged the New York Power Authority (NYPA) to do an energy audit of the Sullivan County Government Center in Monticello and propose measures to save energy. The work of replacing the roof top heating and cooling units (RTU) and replacing all interior and exterior lighting with LED technology was implemented in 2017 and completed in 2018. The retrofit has reduced the site energy use by 28.6% from the baseline year, reduced greenhouse gas emissions by 17.30% and improved the building's Energy Star rating by 105.6%, from 36 to 74.

When we compare 2020 data with the baseline year of 2016, the Government Center outperforms all other County buildings in reductions across all performance metrics – electricity use (both kWh and kBtu), fuel oil use, site and source energy use, site and source energy use intensity, and total greenhouse gas emissions (MtCO<sub>2e</sub>). This performance is directly related to the energy retrofit of HVAC, controls and lighting that was completed in 2018. Cost savings are tied to the unit price of the fuels used at the facility (electricity and fuel oil).

### **Solar-sourced energy provides an increasing share of the County's electricity use at the Human Services Complex in Liberty**

In 2012, the County commissioned a 49.9kW solar array at the Travis Building on the Liberty campus. The County-owned Travis array provides about 7% of the electricity consumed at Travis, the Community Services Building and the Operations and Housekeeping Office at the Liberty campus. The County entered into a Power Purchase Agreement (PPA) with Solar City/Tesla in 2015 through a New York Sun solicitation for solar photovoltaic electricity. The 2.4 MW Solar City/Tesla array, built on County property in Liberty, NY provides fixed cost renewable energy to the Care Center at Sunset Lake, Gladys Olmstead Public Health facility and six other County Facilities. With two solar arrays in service at the Liberty campus, the County's Human Services Complex sourced 64.72 % of its electricity from on-site renewables in 2020. This is a 62.8% increase over the baseline year of 2016, when only the 49.92kW system at Travis was in operation. Net GHG emissions at the Liberty campus, measured in metric tons of carbon dioxide equivalent (MtCO<sub>2e</sub>), went from 669.3 in 2016 to -129.8 in 2020, which resulted in avoided emissions of 821.8 MtCO<sub>2e</sub>. After some initial confusion about the correct project category ("tariff") for the Solar City/Tesla 2.4MW array, the County is now able to move forward with accurate calculations of the full value of GHG reductions and energy cost savings achieved by this on-site solar generation.

### **Energy Star Performance Ratings highlight County facilities that are performing well**

Our five years of benchmarking data also provide an opportunity to see how a modern, code compliant building in the County compares with a national standard for a building of similar size and function. The County Transportation Facility, built in 2009, has an Energy Star performance rating of 96, which is an increase of six points from the baseline year. The building's source and site energy use intensity has decreased by 13.40% and 17.9% respectively, and the site energy use has decreased by 18.0% from the baseline year. These improvements are likely due to the conversion to LED interior lighting. Increased building occupancy may also be a factor, since higher occupancy during the winter months may reduce the amount of propane required for heating. Propane use in 2020 was 25% less than in the 2016 baseline year. The onsite 14.96 kW demonstration solar array provides 26% of the annual average electricity use of the facility. According to the EPA Portfolio Manager benchmarking program, this facility's energy use intensity is 49.87% lower than the national median of similar use and size buildings.

## 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 2: Emissions Performance**

<b>Emissions Performance1</b>					
Date Downloaded: 10/07/2021 11:59 AM EDT					
Date Generated: 10/07/2021 09:49 AM EDT					
Number of properties in report: 19					
Comparing Year Ending: 12/2019 with 12/2020					
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 Green Power (Metric Tons CO2e) Change	Net Emissions (Metric Tons CO2e) Change
Sullivan County Government Center	-43.4	-23.6	-19.9	Not Applicable	-43.4
Emergency Services Training Facility	-1.1	-1.2	0.1	Not Applicable	-1.1
Transportation Facility	-19.1	-18.6	-0.5	-0.5	-15.9
Sullivan County Courthouse	-5.4	-11.1	5.7	Not Applicable	-5.4
Human Services Complex (Liberty)	-123	-103.6	-19.4	-3.5	-84.5
Barryville Maintenance Shops	21.4	17.5	4	Not Applicable	21.4
Callicoon Storm Station - RT. 97	0.2	-2	2.2	Not Applicable	0.2
DPW Maplewood Facility	-22.8	-19.7	-3.1	Not Applicable	-22.8
Livingston Manor Storm Station	-3	-2.1	-0.9	Not Applicable	-3
Sullivan County International Airport	-20.5	-16.8	-3.6	Not Applicable	-11.2
Landfill	-35.8	-33.6	-2.2	Not Applicable	-35.8
Rockland Transfer Station	-0.7	0	-0.7	Not Applicable	-0.7
Ferndale Transfer Station	-0.4	0	-0.4	Not Applicable	-0.4
Highland Transfer Station	-0.8	0	-0.8	Not Applicable	-0.8
Mamakating Transfer Station	-0.2	0	-0.2	Not Applicable	-0.2
D&H Linear Park Museum Interpretive	0.4	0.6	-0.1	Not Applicable	0.4
Hurleyville Cultural Center	-6.5	0	-6.5	Not Applicable	-6.5
1909 Jail	-159.5	Not Applicable	4.9	Not Applicable	-158.4
Sullivan County District Attorney	Not Applicable	Not Applicable	Not Applicable	Not Applicable	39.4

