ULSTER COUNTY
NEW YORK

2024

BUILDING ENERGY BENCHMARKING REPORT

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EXECUTIVE SUMMARY

Buildings across New York State are responsible for approximately one-third of all greenhouse gas emissions and are a significant driver of climate change. As such, increasing building energy efficiency, transitioning to renewable energy and decarbonizing building operations are critical public policy goals. This work can generate many benefits, including decreased emissions, reduced energy costs, economic development and jobs, and improved public health and environmental outcomes.

Ulster County's Executive Order 1 of 2023 (EO1-23) has provided a roadmap for the County to accelerate the reduction of building greenhouse gas emissions and meet the goals of New York's nation-leading Climate Leadership & Community Protection Act. The County has embraced meeting the State's Stretch Energy Code, transitioning completely from fossil fuels, building Electric Vehicle (EV) infrastructure and developing on-site solar where feasible. In support of these actions, it has created an $18 million Decarbonization Capital Reserve, the first ever in the State.

The County's annual Building Benchmarking Report is a critical management tool in this overall effort, providing tracking of energy consumption and calculation of greenhouse gas emissions for County-owned or occupied buildings. Along with the County's Green Fleet Report and Greenhouse Gas Emissions Inventory, the Building Benchmarking Report documents progress that has been made since data was first collected in 2012. The report–provides detailed insights into policy and management actions that can increase energy efficiency, reduce greenhouse gas emissions, and help meet the County's overall climate and energy goals.

The news in Ulster County is compelling. Buildings owned or operated by Ulster County that are reported in this study account for approximately 40-percent of the County's overall government operations greenhouse gas emissions, yet they are also seeing significant improvements. 2024's buildings are more efficient, using 15 percent less energy per square foot than in 2012, and 6 percent less compared to 2023. In keeping with this trend, GHG emissions from benchmarked Ulster County buildings decreased by 30 percent since 2012, and 11 percent compared to 2023. Gains in efficiency are in a large part due updates to Building Management Systems (BMS) that regulate building climate around operating hours more effectively, the upgrading and conversion of thousands of lights and several hundred switches to LED technology at the Department of Social Services, and targeted efficiency and weatherization efforts in other County buildings, and 16 percent of electricity used in County buildings being sourced from on-site solar.

This is good news for taxpayers and the environment. The County's Onsite Energy Manager initiative found that energy conservation measures put in place in 2024 generated $111,900 in savings, and projected additional annual savings of $384,000, should additional measures be put in place.

It is expected that these positive trends will continue. Many projects are planned for 2025 and beyond, including: Electrification of the Ulster County Area Transit (UCAT) bus garage; New Electric Vehicle (EV) infrastructure installations at 6 County-owned locations; Boiler replacement at the Ulster County Law Enforcement Center; Rooftop solar installations at UCAT and the Hall of Records; and, onsite solar installations at the Trudy Resnick Farber Center, the Department of Public Works Quarry site, the Department of Social Services (Development Court), and the new Emergency Communications Center in New Paltz.

The County has much to be proud of and look forward to!

INTRODUCTION

Summary

Compared to the baseline year of 2012, Ulster County buildings are seeing significant improvements to energy efficiency and even more significant reductions in associated Greenhouse Gas (GHG) emissions. In total, GHG emissions from the 31 buildings evaluated in this report equaled 2,924 metric tons of CO2e. This represents an 11 percent reduction in 2024 compared to 2023, and a 29.7 percent reduction compared to the first year data was collected in 2012. Reductions in both site energy and source energy demonstrate that Ulster County is making significant steps toward reaching its sustainability goals.

Scope of Ulster County's 2024 Benchmarking Report	
Properties occupied (owner, lessee, lessor)	53
Properties included in report	31
Total gross floor area included in report	788,688 sq. ft.
Energy used to heat, cool, and power buildings included in report	125,000 kBtu
Fuels used by County buildings	Propane, diesel fuel, fuel oil #2 (heating oil), natural gas, on-site renewable electricity generation, grid purchased energy
Energy sourced from grid electricity	40%
Energy sourced from onsite solar electricity	8%
Energy sourced from natural gas	46%
Energy sourced from propane	4%
Energy sourced from diesel	2%

Background & Reporting Requirements

Resolution No. 447 of 2016 requires Ulster County government to publicly report annual building energy consumption and benchmarking information for County-owned or occupied buildings greater than 1,000 square feet in size.[1] The annual Benchmarking Report is prepared by the Department of the Environment (DoE) and published on the DoE's webpage.

Building energy benchmarking informs the County's strategies to achieve greenhouse gas (GHG) emissions reduction goals and reduce energy costs. This process assists the County in:

- Tracking and monitoring of energy use and GHGs associated with the County's building inventory to better inform operations and planning activities, identify cost-effective interventions, and reduce costs.
- Assessing weather-normalized energy metrics across time periods to understand the impact of building efficiency improvements.
- Aligning with a national standard (EPA ENERGY STAR®) to identify outlier properties within the Ulster County building portfolio.
- Communicating opportunities for energy efficiency improvements through public policy, and building management practices and upgrades.

This report provides the following summary statistics for covered buildings via EPA's EnergyStar Portfolio Manager software:

[1] Resolution 447 of 2016 is provided, in full, in Appendix G.

- **Energy Use Intensity (EUI)** - Energy Use Intensity is the primary energy performance metric used by the EPA's ENERGY STAR program. EUI is the energy use per square foot at a property (kBtu/square foot)**.** Energy intensity may vary yearly based on the building's activities, level of occupancy, and energy efficiency measures like insulation, climate control, or more efficient appliances. This metric is used to compared buildings of different sizes.

- **Weather Normalized EUI** - Weather normalized EUI is the energy a property would have used under average weather conditions (also referred to as "climate normals"). In a given year, weather may be warmer or colder than the building's average climate; weather normalized energy accounts for this difference. This metric allows comparison of buildings across years where weather may impact the energy intensity.

- **Annual Greenhouse Gas (GHG) emissions** – Annual GHG emissions is the amount of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) gases emitted into the atmosphere from the burning of fossil fuels, typically provided in units of carbon dioxide equivalents (CO_2e). GHG emission metrics provide insight into the impact of human activity on the environment and the climate.

- **Energy Performance Score** (where available) – EPA PM calculates an "ENERGY STAR Score" for building performance by normalizing properties by climate and operations and comparing them nationally (Appendix A). This process requires highly specific data about a building's operations, including hours of operation, number of computers, workers per shift, and more. Energy Performance Scores for individual buildings help the County prioritize measures for additional energy upgrades and improvements.

Methodology

This report benchmarks building energy using EPA's ENERGY STAR Portfolio Manager (EPA PM) application, an online tool with the capability to track energy, water, and waste consumption and which calculates a variety of energy performance metrics as well as GHG emissions. The tool also calculates weather normalized metrics and allows for the comparison of the impacts of weather-related differences year-to-year. More details about the EPA PM application are provided at Energy Star's Portfolio Manager Technical Reference document for Greenhouse Gas Emissions.

Ulster County measures its progress towards GHG emission reductions using data from 2012 as its baseline value. The following section explains how data is compiled and how buildings are selected for benchmarking.

- **Data Compilation and Entry, EPA PM Report Exports:** Energy usage and cost data is obtained directly from fuel vendors through web-based portals or data requests, and/or from the County Department of Public Works (DPW), and is then compiled by DoE staff and re-formatted for entry into EPA PM. The data for each individual utility bill and tank fuel delivery, etc. are manually entered in EPA PM for each fuel type and associated account or meter at each County facility. Summary reports are exported from EPA PM and used to develop the charts and figures included in each annual Building Energy Benchmarking Report.

- **Electric Vehicle (EV) Charging Stations:** Ten Ulster County properties have EV charging stations on site, both for public use and Ulster County Fleet use. EV charging stations may be configured to draw energy directly from the building electrical panel (i.e. not separately metered or sub-metered). To avoid attributing EV charging station electricity usage to a building's total energy use, the electricity usage from EV charging station(s) is deducted from building electricity meters in EPA PM. EV charging station data is collected from charging networks and web-based portals. Ulster County government's vehicle fleet and public EV charging station electricity use is reported in the Ulster County Green Fleet Annual Report viewable on the DoE's webpage.

- **On-site Solar Energy Generation:** In 2024, active onsite solar energy generation projects include rooftop solar panels on the county-owned New Paltz Highway Substation salt shed located at the Ulster County Fair Grounds, and the "Ulster Landfill Solar Project", a 1.9 MW DC array at the former landfill site in the Town of Ulster.

  The solar panels on the salt shed at the New Paltz Substation (installed in 2011) account for approximately 75% of the annual energy demand of the facility through a net-metering agreement with Central Hudson. The County receives credits for kWh generated beyond what is attributed to building energy usage. Due to Central Hudson's protocol for tracking net metering in 2024, actual energy usage data was unattainable for the New Paltz Substation. This resulted in the building's omission from the 2024 Building Benchmarking Report, although it is a celebrated example for onsite solar energy generation.

  In 2018, the County commissioned the Ulster Landfill Solar Project, a 1.9 MW DC array at a closed landfill site in the Town of Ulster. The electricity generated by the array is applied to County utility invoices through a remote net metering arrangement. In 2024, the array generated enough electricity to cover 37% of the Ulster County Law Enforcement Center's (UCLEC) electricity needs, or approximately 16% of all electricity usage for benchmarked buildings and 8% of energy usage for benchmarked buildings. The array is owned by Ulster County and the decommissioned landfill is owned by the Town of Ulster. This project is a successful model for utilizing closed brownfield sites for renewable energy projects and solar energy generation. Read more about County renewable energy generation projects on the County's website.

- **Fixed Usage Area Lighting:** Eighteen Ulster County properties are billed monthly for utility-provided outdoor area lighting, which is reflected as "*Flat Charge"* usage on the utility invoice for the account and is billed by Central Hudson according to Service Classification Number 5 rates. The cost includes fees for the rental of the lighting equipment from Central Hudson. Where applicable, a property use-type of parking and parking area square footage estimate are entered into EPA PM for improved accuracy in calculating energy use metrics. Per a recommendation from EPA PM, energy use for area lighting is omitted from building energy use. As such, fixed area lighting meters are created and tracked separately in EPA PM for each respective building.

- **Factors and Conversions:** The EPA Portfolio Manager application converts all fuel types to a common energy unit—thousands of British thermal units (kBtu)—to allow for aggregation to calculate whole-building energy use. To do so, EPA PM applies standard thermal conversion factors (Table 1). This conversion allows the comparison of relative magnitudes of energy use across fuel types and buildings.

Table 1: Energy Conversion Factors

Fuel Type	Input Unit	Conversion Factor
Electricity	kWh	3.412 kBtu/kWh
Natural Gas	CCF	102.6 kBtu/CCF
Propane	Gallons	92 kBtu/gal
Fuel Oil (No. 2)	Gallons	138 kBtu/gal
Diesel	Gallons	138 kBtu/gal
Wood	Tons (US)	17,480 kBtu/ton

- **Selection of Buildings for inclusion in the Benchmarking Profile:** Ulster County occupies 53 properties as owner, lessee, and lessor.[2] This 2024 report includes 31 properties in its benchmarking profile. Properties are omitted from benchmarking for a variety of reasons:
  - **Gross Floor Area less than 1,000 square feet**
  - **Incomplete Annual Energy Use Data:** EPA PM requires a full year's worth of data to calculate summary statistics. As such any buildings that are unoccupied for portions of the year or under construction for part of the year are emitted from the benchmark for that year.
  - **Data inconsistencies:** Data received from energy suppliers is verified prior to it being used in this report. In some cases, the data has been found to be incorrect. The 2024 report omits 22 properties where data is not available or is inconsistent.
  - **Leased Spaces without Metered Energy:** The report omits properties where Ulster County leases office space without sub-metering. In these cases, energy use data for the leased spaces cannot be separated from whole building energy use.

For more additional details about this report's methodology, including how the approach used in 2024 differs from that which was used in 2023, see Appendix A.

Table 2: Summary Statistics for Buildings in 2024 Benchmarking Report

Benchmarking Metric	Value	Unit	% Change 2012-2024	% Change 2023-2024
Properties occupied (owner, lessee, or lessor)	53	buildings	-	-
Properties benchmarked in report	31	buildings	15.0%	7.0%
Total floor area included in report	788,688	sqft	7.7%	5.9%
Source Energy Used	125,039,429	kBtu	-8.5%	-4.0%
Site Energy Used	66,339,923	kBtu	-	-
Source Energy Use Intensity	159	kBtu/sqft	-15.0%	-9.0%
Weather-Normalized Source EUI	163	kBtu/sqft	-	-
GHGs emitted from on-site energy use	2,924	MTCO2e	-29.7%	-11.0%

[2] A full list of buildings can be found in Appendix F.

Types of Energy Used by Buildings	% of Site Energy Use
Electricity (grid purchase)	40%
Electricity (onsite solar)	8%
Natural Gas	46%
Propane	4%
Diesel	2%
Fuel Oil #2	<0.01%

BUILDING ENERGY USE

Ulster County uses energy for heating, cooling, and powering its buildings. This energy is provided in several forms by 7 different suppliers (Table 3). The DoE collects energy use data from each supplier and enters it manually into EPA PM.

Table 3: Energy Type & Suppliers

Energy Type	Supplier (Data Source)
Electricity	Delivery: Central Hudson (web access) NYSEG (web access & customer service) Supply: Constellation NewEnergy, Inc. (web access via Central Hudson); additional ESCOs as applicable
Natural Gas	Delivery: Central Hudson (web access) Supply: Agera Energy, LLC (customer service request) Family Energy, Inc. (web access via Central Hudson; additional ESCOs as applicable
Fuel Oil	Bottini Fuel (web access & customer service request); additional vendors as applicable
Propane	Nolan Energy & Sons (customer service request); additional vendors as applicable
Diesel Fuel (for generators)	Bottini Fuel (customer service request); additional vendors as applicable

2024 Summary Statistics

The County's buildings vary in size, energy consumption, energy type usage, and energy use intensity (Table 4). For this reason, energy usage is identified with the *source energy usage* metric, which allows for better comparison across buildings using different energy types. In 2024, benchmarked buildings used a total of 125 million kBtu of source energy (compared to 66.3 million kBtu of on-site energy; Appendix C). This energy use, applied across the 788,000 square feet of included floor space, equates to an average building Energy Use Intensity (EUI) of 159 kBtu/sqft. However, the weather-normalized EUI is 163 kBtu/sqft, indicating that buildings used less power in 2024 than they typically would have due to mild weather.

As expected, the three buildings with the largest absolute energy use are also the three biggest buildings: the Ulster County Law Enforcement Center (UCLEC), Department of Social Services (DSS), and the County Office Building at 244 Fair St. in Kingston. These three buildings account for over two-thirds of all County building energy use and nearly three-fifths of total floor space.

Some buildings in Ulster County's portfolio are more energy-intensive than others, on both a building-by-building and square footage basis. These include Emergency Management, the Hall of Records, Information Services, and UCLEC. These buildings have a higher-than-average EUI because building hours are longer than average and/or building needs are generally more energy intensive than others in the County portfolio.

Table 4: Summary of Energy Performance for 31 County Properties in 2024 Report

Property	Floor Area (sqft)	Building Source Energy Use (kBtu)	Annual Source EUI (kBtu/ft²)	Annual Weather Normalized Source EUI (kBtu/ft²)
21 Elizabeth St*	5,742	13,048	2	2
368 Broadway	31,683	2,259,217	71	74
Board of Elections	12,511	799,411	64	66
Carr Building (1 Pearl St.)	5,438	615,124	113	125
County Office Building Complex	62,396	10,025,560	161	164
County Pool / Fairgrounds	7,126	671,041	94	94
DSS / Development Court	117,977	18,290,039	155	155
Emergency Management 911†	3,537	1,551,788	439	440
Environment (17 Pearl St.)	4,229	296,056	70	75
Golden Hill Complex	39,600	5,430,893	137	143
Hall of Records	22,550	4,766,920	211	218
Highway Substation - Accord	2,324	437,369	188	199
Highway Substation - Boiceville	13,690	540,998	40	43
Highway Substation - Plattekill	2,265	348,620	154	187
Highway Substation - Saugerties	3,552	442,842	125	136
Highway Substation - Shandaken	5,364	423,687	79	80
Highway Substation - Shawangunk	4,433	561,811	127	133
Highway Substation - Sundown	4,984	370,285	74	74
Highway Substation - Ulster Heights	3,545	340,729	96	101
Hutton Building	3,386	17,390	5	5
Information Services†	13,174	3,722,773	283	288
Persen House	6,405	46,856	7	7
Probation (Restorative Justice Center)	20,724	3,067,820	148	151
Public Safety Training Center	6,804	396,618	58	58
Public Works Building	10,740	1,982,640	185	185
Public Works Building and Quarry	35,000	4,550,191	130	143
Sojourner Truth Ulster Landing Park	3,198	150,702	47	49
Trudy Resnick Farber	20,732	2,705,888	131	129
UCAT	23,413	4,314,693	184	189
UCLEC (Law Enforcement Center) †	277,000	55,533,502	201	203
Van Dale Garage - Fabrication Shop	15,146	896,488	59	63
Building Total	**788,688**	**125,039,429**	**-**	**-**
Building Average	**-**	**-**	**159**	**163**

Annual EUI is color-coded based on energy efficiency. Buildings with high energy intensity are marked with red.
The average annual EUI for all buildings (bottom row) is calculated by dividing the total building energy use by the total benchmarked square footage.

*21 Elizabeth St. is included in this summary statistics report, but the building EUI metrics are not counted towards the total building average. Because the site is unoccupied, the property's energy use is unusually low and would skew the building average if included (See note in Appendix F).

† Buildings such as Emergency Management, Information Services, and UCLEC have higher-than-average energy use intensities. This is because these buildings are occupied for more hours each day and/or use more energy-intense applications than the average office building.

Types of Energy Used by Buildings

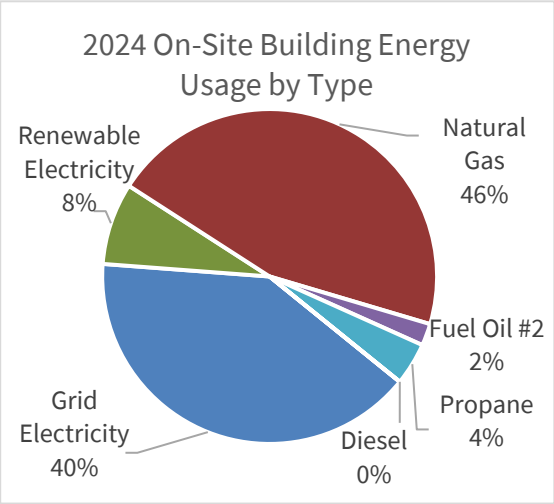
In 2024, 48% of energy used in County buildings was from electricity (40% grid purchase, 8% renewable generation at County facilities). Natural gas supplied 46% of energy used. Small amounts of propane (4%) and fuel oil #2 (2%) were used, mostly at highway substations and in machine shops. A negligible amount of diesel was used to fuel building generators (Table 5). Over 8% of total energy usage came from renewable electricity generated on site (Figure 1).

As in previous years, starting in 2011, Ulster County has generated electricity via on-site rooftop solar panels at the New Paltz Highway Substation salt shed. Due to Central Hudson's protocol for tracking net metering in 2024, actual energy usage data is currently unattainable for the New Paltz Substation. This resulted in the building's omission from the 2024 Building Benchmarking Report. Starting in 2025, actual readings of the production meter will be included in data gathering and reporting to account for solar panel electricity generation. In addition, a request to utility provider Central Hudson has been submitted for obtaining actual energy usage.

Table 5: Annual Fuel Use for 2024 Buildings

Fuel Type	**Annual Building Portfolio Use**
Propane	2,732,327 kBtu
Diesel	10,902 kBtu
Fuel Oil #2	1,417,246 kBtu
Natural Gas	30,437,202 kBtu
Electricity (Grid Purchased)	7,757,520 kWh (equivalent to 26,906,471 kBtu)
Electricity (On-site generation)	1,545,600 kWh (equal to 5,273,587 kBtu)

Figure 1: Breakdown of Energy Type



Trends in Energy Use

Significant reductions in energy use intensity were made in 2024 compared to both the 2012 baseline year and 2023. In 2024, County buildings are more efficient, using 15 percent less energy per square foot than in 2012. Benchmarked County buildings used 6 percent less energy per square foot in 2024 when compared to 2023 (Table 6). Some of the most energy-intensive buildings show remarkable improvements in energy efficiency. For example, the Information Services (IS) building, has halved its energy use since 2012. Additional progress can reasonably be expected with the continued implementation of the recommendations from the County's Onsite Energy Manager (OsEM) project, and further implementation of Executive Order 1 of 2023.

Table 6: Source EUI by Building by Year for Buildings Included in the 2024 Benchmarking Report (kBtu/sqft)

Building	Year 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	% change from 2012
21 Elizabeth St *	-	-	-	-	-	-	-	-	-	-	5*	3*	2*	N/A
368 Broadway	-	-	-	-	-	-	-	-	-	-	10*	-	71	N/A
Board of Elections	-	-	-	-	-	-	-	-	-	-	-	-	64	N/A
Carr Building (1 Pearl St.)	130	123	173	168	151	160	164	176	158	128	111	115	113	-13%
County Office Building Complex	192	203	206	202	188	186	191	184	163	153	159	162	160	-17%
County Pool / Fairgrounds	94	101	156	107	117	100	132	116	144	190	150	114	91	-7%
DSS / Development Court	126	128	90	96	141	136	132	159	148	-	158	227	152	23%
Emergency Management 911	426	457	435	435	436	414	468	479	463	538	396	392	435	2%
Environment (17 Pearl St.)	75	111	108	97	76	83	79	63	60	71	83	57	70	-7%
Golden Hill Complex	163	166	169	185	156	157	175	161	154	98	145	136	137	-16%
Hall of Records	290	333	351	320	288	238	258	241	231	-	210	209	211	-27%
Highway Substation - Accord	150	187	186	203	152	170	156	-	-	-	-	147	188	25%
Highway Substation - Boiceville	38	44	50	46	34	38	48	36	39	52	46	38	40	3%
Highway Substation - Plattekill	190	215	184	173	130	144	173	158	129	143	170	122	150	-20%
Highway Substation - Saugerties	127	165	177	170	114	140	122	147	114	135	160	139	122	-3%
Highway Substation - Shandaken	13	51	111	143	123	127	142	106	75	82	85	117	79	N/A
Highway Substation - Shawangunk	69	98	99	86	75	79	77	87	61	91	156	122	127	83%
Highway Substation - Sundown	69	101	108	95	77	93	101	89	75	67	80	87	74	8%
Highway Substation - Ulster Heights	152	163	171	142	112	113	142	124	119	119	144	84	94	-38%
Hutton Building	5	6	7	3	3	3	4	3	3	3	9	12	5	4%
Information Services	566	558	543	535	531	454	436	364	323	-	318	289	282	-50%
Persen House	3	3	2	3	3	3	4	4	2	4	4	7	7	143%
Probation (Restorative Justice Center)	134	153	152	135	122	121	141	155	156	155	133	148	148	10%
Public Safety Training Center	-	-	-	-	-	-	-	18	39	44	65	45	58	N/A
Public Works Building	171	171	184	167	149	177	186	221	226	232	220	230	185	8%
Public Works Building and Quarry	122	140	153	144	121	144	149	143	122	124	137	128	130	7%
Sojourner Truth Ulster Landing Park	51	54	61	45	39	40	39	40	39	42	51	64	47	-8%
Trudy Resnick Farber	214	204	213	230	178	177	167	175	171	162	117	114	131	-39%
UCAT	197	214	230	226	198	212	198	168	163	137	167	189	184	-7%
UCLEC (Law Enforcement Center)	232	234	247	236	234	221	221	201	203	222	194	197	201	-13%
Van Dale Garage - Fabrication Shop	63	73	143	66	59	79	75	81	66	60	66	54	59	-6%
Yearly Average	**187**	**194**	**198**	**191**	**188**	**182**	**184**	**175**	**169**	**172**	**158**	**175**	**159**	-15%

*Energy use from these buildings was not factored into the yearly average.

ǂ The yearly average in 2021 excluded a few energy-intensive buildings, including Information Services. This average is therefore not representative of a real improvement in energy efficiency.

GREENHOUSE GAS EMISSIONS

Greenhouse gas (GHG) emission estimates were calculated using EPA standard conversion factors (Table 7). These factors were applied to the site energy consumption values to calculate annual emissions. Fossil fuel emissions factors remain constant year-to-year. The electricity emissions factor, however, changes annually based on the emissions associated with Ulster County's electricity grid, New York Upstate energy grid (NYUP). The 2024 Benchmarking Report uses the NYUP emissions factor from 2023, which is the most currently available. In 2023, 32.27 kg CO2e were produced for each MBtu of electricity generated.[3]

Ulster County is well-poised to reduce its GHG footprint through further electrification, as the NYUP electricity emissions factor is significantly lower than any fossil fuel alternative (Table 7). Additionally, the NYUP emissions factor is 70% smaller than the national average, attributed to statewide electricity generation from clean power sources.

Table 7: GHG Emissions Conversion Factors in 2024[4]

Fuel Type	**Conversion Factor (kg CO2e/MBtu)***
Diesel Fuel	74.21
Electricity (eGRID Region: NYUP, 2023 data)	32.27
Electricity (onsite Green Power[5])	0.00
Natural Gas	53.11
Heating Oil (No. 2)	74.21
Propane	64.25

*1 MBtu = 1,000 kBtu

GHG emissions from benchmarked Ulster County buildings have decreased by 30% since 2012 (Table 8). Most buildings have made significant improvements in the intervening years, with common reductions of 30% or greater. Only four buildings, Department of Social Services (DSS), Highway Substation in Accord, the Highway Substation in Boiceville, and the Persen produce more GHG emissions than they did in 2012 (Table 8). Only one building of these buildings (DSS) represents a significant change in absolute emissions increase. This may be due to increased activities in the building or time periods where significant changes occurred such as infrastructure upgrades or building renovations. Department of Environment staff are investigating causes or variables to GHG emissions increases in such buildings to ensure accuracy in data analysis through conversations with building managers and a more detailed review of the available data.

[3] This emissions factor can be extrapolated to 2024 as part of a standard EPA benchmarking methodology. Since 2012, Grid-purchased electricity has become cleaner as less power is generated from coal. The 2023 electricity generation emissions factor is an improvement over 2022, when electricity became more carbon-intensive following the closure of Indian Point nuclear facility.

[4] Retrieved from: https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf

[5] In 2024, 16.3% of electricity used by County buildings was generated through on-site solar, resulting in zero emissions for that proportion of energy. This GHG emissions reduction was not accounted for by the 2024 report. Subsequently, the GHG emissions reported in this document are an overestimate of GHG emissions – in reality, emissions are even lower. Future reports will more accurately incorporate onsite green energy.

Table 8: Total GHG Emissions (MTCO2e) for Ulster County Properties in the 2024 Benchmarking report (2012 to 2024)

Building	Year 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Building Total	% change 2012-2024
21 Elizabeth St	-	-	-	-	-	-	-	-	-	-	0.4	0.2	0.2	0.7	N/A
368 Broadway	-	-	-	-	-	-	-	-	-	-	7.6	-	37.0	44.6	N/A
Board of Elections	-	-	-	-	-	-	-	-	-	-	-	-	14.3	14.3	N/A
Carr Building (1 Pearl St.)	24.5	26.4	32.0	31.1	26.3	29.0	28.1	28.6	26.9	23.8	23.9	24.0	24.4	348.9	0%
County Office Building Complex	316.3	350.1	333.9	321.2	270.3	277.4	262.4	247.5	224.5	207.9	195.0	215.2	203.4	3,425.1	-36%
County Pool / Fairgrounds	18.6	23.6	50.8	23.4	25.8	19.1	25.2	18.8	20.6	23.0	14.0	14.3	15.2	292.2	-18%
DSS / Development Court	359.2	389.3	292.3	298.4	387.7	384.8	359.4	439.3	415.1	-	458.4	874.9	438.7	5,097.4	22%
Emergency Management 911	31.0	33.7	29.2	30.8	25.3	24.6	25.5	23.0	23.6	27.1	23.6	21.3	27.4	346.2	-12%
Environment (17 Pearl St.)	12.5	18.1	17.4	15.4	11.8	12.0	11.6	10.1	9.2	10.4	13.3	11.3	10.5	163.6	-16%
Golden Hill Complex	144.0	151.1	148.6	171.9	114.1	116.0	117.2	101.5	93.6	69.4	102.1	88.7	88.9	1,507.3	-38%
Hall of Records	166.2	200.3	204.7	185.5	140.7	112.6	112.6	120.4	113.9	-	109.5	100.2	100.0	1,666.7	-40%
Highway Substation - Accord	6.8	8.5	7.6	11.9	5.0	5.6	4.6	-	-	-	-	4.7	9.9	64.5	45%
Highway Substation - Boiceville	20.2	25.9	26.9	25.1	18.0	19.0	27.4	17.2	20.2	29.2	25.1	19.1	20.4	293.7	1%
Highway Substation - Plattekill	19.4	23.4	16.8	15.6	9.8	11.1	15.2	14.1	8.2	10.4	9.9	5.2	11.1	170.2	-43%
Highway Substation - Saugerties	20.6	26.1	24.0	23.8	15.4	23.8	18.8	24.5	14.5	20.2	24.5	21.2	17.9	275.3	-13%
Highway Substation - Shandaken	1.3	13.0	29.6	42.7	34.8	36.2	36.5	24.3	17.8	19.8	21.9	26.6	18.4	322.8	N/A
Highway Substation - Shawangunk	16.1	24.5	21.2	17.6	14.3	16.6	16.0	18.3	11.7	14.1	21.2	12.7	15.1	219.6	-6%
Highway Substation - Sundown	19.5	26.8	26.5	24.1	18.9	23.7	25.5	22.4	19.0	16.4	19.4	21.9	17.7	281.5	-9%
Highway Substation - Ulster Heights	25.0	25.6	26.1	22.5	18.2	18.8	24.0	20.9	20.5	19.0	22.8	13.3	16.2	272.9	-35%
Hutton Building	0.3	0.4	0.4	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.4	0.5	0.2	3.2	-38%
Information Services	160.2	159.8	148.2	148.3	117.3	101.3	93.0	67.9	66.7	-	74.6	62.1	63.9	1,263.3	-60%
Persen House	0.4	0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.1	0.3	0.4	0.5	0.5	4.2	42%
Probation (Restorative Justice Center)	76.9	89.3	87.3	79.1	66.2	68.3	75.4	67.4	68.4	66.8	65.2	60.4	61.9	932.5	-20%
Public Safety Training Center	-	-	-	-	-	-	-	5.9	13.6	7.7	13.6	5.3	7.2	53.2	N/A
Public Works Building	42.8	47.2	48.0	42.1	32.1	44.2	42.1	54.8	52.9	55.1	55.0	51.9	34.8	603.0	-19%
Public Works Building and Quarry	196.6	233.6	231.4	233.4	177.7	211.8	214.6	203.5	166.6	169.0	191.7	178.5	183.6	2,591.9	-7%
Sojourner Truth Ulster Landing Park	6.3	7.0	8.0	5.7	5.2	5.4	5.4	5.0	5.5	6.1	7.4	9.6	6.2	82.8	-1%
Trudy Resnick Farber	170.6	175.6	182.7	204.6	152.2	150.6	133.6	131.9	125.9	109.2	84.6	61.8	80.1	1,763.2	-53%
UCAT	134.8	150.6	145.2	138.8	110.2	119.1	103.7	100.3	83.2	71.6	101.6	94.2	92.7	1,446.0	-31%
UCLEC (Law Enforcement Center)*	2,113.5	2,121.5	2,286.8	2,127.7	1,949.5	1,712.2	1,766.8	1,574.5	1,487.1	1,428.4	1,450.7	1,265.9	1,264.0	22,548.5	-40%
Van Dale Garage - Fabrication Shop	45.2	59.0	130.1	46.5	40.6	61.3	54.5	58.7	43.9	36.5	40.0	28.1	34.6	679.1	-23%
Annual Total[ǂ]	**4,148.8**	**4,410.6**	**4,555.9**	**4,287.5**	**3,787.8**	**3,604.8**	**3,599.5**	**3,401.3**	**3,153.4**	**2,441.3**	**3,177.5**	**3,293.6**	**2,916.3**	**46,778.2**	-30%

This table compares GHG emissions for the benchmarked County buildings from 2012 to 2024. As of 2024, Total building GHG emissions have been reduced by 1,232 metric tons of CO2e per year. The final column in this table shows the percentage change from the baseline year 2012. Most properties reduced their GHG emissions (highlighted in green) while some increased (highlighted in red).

* Actual emissions from UCLEC are lower than depicted in Table 8. In 2024, 37% of UCLEC's electricity usage was generated using solar power at the closed landfill site.

ǂ Emissions-free onsite power generation accounts for 16.3% of all electricity use and 8% of all energy use in the 2024 building portfolio. This equates to a significant reduction in GHG emissions from building energy use. While the current methodology does not account for these GHG reductions, the DOE is updating report methodology to include the impact of onsite solar generation in the 2025 building energy benchmarking report.

RECOMMENDATIONS FOR BUILDING ENERGY EFFICIENCY IMPROVEMENTS AND UPGRADES

- **RECOMMENDATION #1:** Continue to Implement Recommendations from the 2025 Onsite Energy Manager (OsEM) Report

Per Resolution No. 117 of 2023, Ulster County obtained services of an Onsite Energy Manager (OsEM) to improve energy efficiency and reduce greenhouse gas emissions in County buildings by "delivering energy, process, and operational improvements." The County contracted with Guth DeConzo Consulting Engineers P.C. as the OsEM through a NYSERDA-funded pilot program. This project was 75% funded by NYSERDA and 25% funded by Ulster County.

The goal of the project was to attain a 3% reduction in electricity usage and a 3% savings in fossil fuel energy usage (Appendix H). To achieve this, the OsEM identified Energy Conservation Measures (ECMs) that could be implemented by the County to reduce energy use. In collaboration with the County's Department of Public Works (DPW), the OsEM project began implementing cost-effective EMCs. By the time of the project's completion in late 2024, the County had surpassed its project goals, reducing electricity usage by 5.4% and fossil fuel usage by 8.1%, leading to an annual dollar savings of $111,900.

While the OsEM project exceeded initial goals, the OsEM report identified many additional ECMs that the County could pursue. Combined, the ECMs identified in the OsEM report could reduce electricity usage by 19.4% and fossil fuel use by 25.5%, saving the County $384,000 annually. Some of the additional strategies the County could implement include:

- Scheduling Building Management Systems (BMSs) to operate heating, cooling, and lighting in "unoccupied modes during hours of limited or no occupancy." This would reduce energy expenditure during hours when energy use is not necessary.
- Ensure that BMS contractors are meeting agreed upon contractual requirements and maintaining systems for effective energy efficiency.

The OsEM report recommends dozens of ECMs with a payback period of less than one year. If prioritized by County staff and implemented, these projects could significantly reduce energy usage and save on operational costs within a year of implementation.

- **RECOMMENDATION #2:** Continue to electrify buildings to capitalize on NYUP electric grid benefits

Ulster County's electric grid (NYUP) produces 70% fewer GHGs per MWh of electricity generated, compared to the national average. This is thanks to a greater proportion of clean power generation in New York State. Ulster County can make better use of this opportunity by investing in electric heating systems.

APPENDICES

Appendix A: Changes to Methodology

Changes from 2023 Methodology

- Source energy metrics are now used for all summary statistics instead of a mix of source and site energy use metrics. Because source energy compares all of the impacts associated with energy consumption, this allows a more accurate comparison between buildings that utilize different fuel types. Energy type is still reported in site energy metrics.

- In order to generate weather-normalized energy use scores, Portfolio Manager requires energy use inputs to be recorded each month. Some buildings were missing inputs in previous years. Subsequently, Portfolio Manager could note calculate weather-normalized energy use scores. When possible, data was back-filled to generate accurate estimates.
    - Buildings with heavy fossil fuel use were more prone to this error. Because fuels (like Diesel and Fuel Oil #2) are often delivered in large batches every few months, PM would flag these buildings as "missing data." To enable the calculation of weather-normalized EUI, the DoE began inputting months without fuel deliveries with a 0.

- The GHG emissions factor for the NYUP electricity grid has been updated. Previous years used an emissions factor of 39 kg CO2e/MBtu. Starting in 2024, this report uses the most up-to-date emissions factor for calculating GHG emissions from grid electricity generation. The emissions factor included in this report is 32.27 kg CO2e/MBtu. This data is sourced from the EPA's 2023 eGRID dataset and calculated by EPA Portfolio Manager. This data is typically released on a two-year delay, which is why this report uses a 2023 emissions factor.

- 21 Elizabeth St. is still included on the benchmarking buildings list, though the building remains unoccupied through 2024. The building's energy use is provided, but excluded from EUI averages.

- The New Paltz Highway Substation was omitted from the 2024 benchmarking buildings list due to inability to retrieve energy usage data from Central Hudson as a result of net metering.

- Per Resolution 447 of 2016, the Department of Environment now reports on annual energy trends between 2012 and the current year. To do this, DoE consolidated data from previous reports and collected additional data from utilities.

    - Due to data constraints, energy use trends for all metrics could not be performed. Data gaps occurred in 2020 and 2021 because of Central Hudson implementing a new erroneous customer billing system. Therefore, year-over-year analysis of Weather Normalized EUI could not be completed effectively, as it requires monthly energy usage inputs.

Appendix B: Glossary and List of Acronyms

The following is a list of terms used throughout this report, including various acronyms:

BMS (Building Management System)

A computerized system that allows for the automatic regulation of building climate, including heating, ventilation, and air conditioning (HVAC).

Btu (British Thermal Unit)

A measure of energy. One Btu is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. The Btu is a common measure of energy usage, allowing comparisons between thermal energy (burning fossil fuels) and electrical energy (from the grid).

kBtu

One thousand Btus. One cubic foot of natural gas can be burned to produce about 1 kBtu. One gallon of gasoline can be burned to produce 120 kBtu (U.S. Energy Information Administration).

MBtu

One million Btus. The average household in the U.S. Northeast uses 27 MBtu of energy each year to run heating, cooling, lighting, and other appliances.

ECM (Energy Conservation Measure)

Strategies and technologies aimed at enhancing system and building efficiency, particularly in HVAC systems, to reduce energy consumption and alleviate strain on electricity grids, especially during extreme weather events and peak energy demand.

Energy

Energy is the capacity to create change. In buildings, it is used to heat, cool, power lighting, and run various appliances. Energy in buildings can be generated on-site using fuels, solar panels, or sourced from the electric grid. Both fossil fuel use and electricity use are forms of energy use, and can be measured in Btus.

ENERGY STAR PORTFOLIO MANAGER (PM)

A free online software provided by the U.S. Environmental Protection Agency, Portfolio Manager allows clients to track energy use over time and generate key energy metrics for a set of buildings. The metrics that PM can calculate include Weather-Normalized Energy Use and a Comparison to National Average Energy Use for a given type of building.

Electricity Grid Purchase

This electricity, used to power buildings, is sourced through the local electric grid. The County purchases this electricity through ESCOs who operate transmission wires.

ESCO (Energy Service Company)

Site Energy

The amount of energy used on-site to heat, cool, power lighting, and run other building applications.

Source Energy

This energy metric accounts for more than Site Energy, including the additional energy expenditures associated with production, transmission, and delivery of the fuel to buildings.

Weather-Normalized Energy Use

Weather normalized energy use is the energy a property would have used under average weather conditions (also referred to as climate normals). In a given year, weather may be warmer or colder than the building's average climate; weather normalized energy accounts for this difference.

EUI (Energy Use Intensity)

A measure of energy use per square foot of floor space, allowing for comparisons to be made across buildings of different sizes. EUI can measure Site or Source energy. Measured in units of kBtu / sqft.

EVSE (Electric Vehicle Supply Equipment)

An electric vehicle charging station.

GHG (Greenhouse Gas)

Gases that trap heat in the Earth's atmosphere, raising the average temperature of the planet. Gases most associated with building energy use are Carbon dioxide (CO2), Sulphur Dioxide (NO2), and Nitrogen Oxides (NOx). Each greenhouse gas traps heat with different levels of potency. In order to compare the impact of different gases, gases other than CO2 are converted to CO2-equivalent (CO2e) based on their relative global warming potential.

MTCO2e

Metric Tons Carbon Dioxide (CO2) Equivalent. A standard measure of greenhouse gases based on the global warming potential of gases relative to CO2.

Heat Pump (ASHP/GSHP)

A device that transfers heat from one space to another. A heat pump can both heat and cool buildings. These devices are very energy-efficient, making them a good choice for reducing energy use. Air Source Heat Pumps (ASHP) transfer heat between buildings and the surrounding air; Ground Source Heat Pumps (GSHP) transfer heat with a series of pipes underground.

kWh (kilowatt-hour)

A measure of electricity defined as the amount of energy delivered by one kilowatt of energy over one hour. The average refrigerator uses about one kWh of electricity each day.

MWh (megawatt-hour)

The amount of energy delivered by a megawatt (1,000 kilowatts) of energy over one hour.

Net Metering
A billing mechanism where a utility provider credits solar energy system owners for the electricity they generate to the grid through balancing energy usage on the system owner's electricity usage bill.

NYUP (New York Upstate)
The electricity grid that includes most of New York State, including Ulster County.

NYSERDA (New York State Energy Research & Development Authority)

NYSEG (New York State Electric and Gas)

OsEM (Onsite Energy Manager)
An energy expert hired by the County to investigate best energy practices in County Buildings. The OsEM developed a report for the County, finished in 2025.

REC (Renewable Energy Certificate)
"A market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource."[6]

Scope 1 Emissions
These emissions occur as the direct result of County operations, including on-site heating and vehicle use.

Scope 2 Emissions
Theses emissions occur as the *indirect* result of County operations, and include the emissions associated with electricity generation for electric energy used in County buildings and electric cars.

Sub-metering
Meters that track electricity use and natural gas consumption in a particular subsection of a building.

[6] Source: U.S. EPA, Renewable Energy Certificates (RECs). Accessed November 3, 2025.

Appendix C: Site vs Source Energy Use

Site and Source Energy: The EPA ENERGY STAR® program distinguishes between **site** and **source energy**. **Site energy** is the usage as measured exclusively from the building, which is the quantity recorded in utility bills. **Source energy** accounts for the additional energy expenditures associated with production, transmission, and delivery of the fuel. The source energy metric allows the energy efficiencies of buildings to be compared without imparting a bias based on the type of fuel they consume (Table 9). National average ratios are used within the EPA ENERGY STAR scoring system to prevent any individual building from being penalized or credited due to the relative efficiency of its energy provider (Table 10)

Table 9: Comparison of Site vs Source Energy Use for 2024 benchmarking buildings

Property	Sum of Site Energy Use (kBtu)	Sum of Source Energy Use (kBtu)
21 Elizabeth St	4,660	13,048
368 Broadway	973,942	2,259,217
Board of Elections	362,259	799,411
Carr Building (1 Pearl St.)	482,964	615,124
County Office Building Complex	4,910,122	9,973,379
County Pool / Fairgrounds	310,829	651,313
DSS / Development Court	9,929,565	17,876,489
Emergency Management 911	677,870	1,539,703
Environment (17 Pearl St.)	214,179	296,056
Golden Hill Complex	2,339,501	5,430,893
Hall of Records	2,389,699	4,766,920
Highway Substation - Accord	217,835	437,369
Highway Substation - Boiceville	373,685	540,998
Highway Substation - Plattekill	212,733	340,661
Highway Substation - Saugerties	319,264	434,892
Highway Substation - Shandaken	322,878	423,687
Highway Substation - Shawangunk	310,641	561,811
Highway Substation - Sundown	302,524	370,285
Highway Substation - Ulster Heights	276,527	332,768
Hutton Building	6,211	17,390
Information Services	1,648,065	3,715,903
Persen House	16,734	46,856
Probation (Restorative Justice Center)	1,499,976	3,067,820
Public Safety Training Center	173,977	393,332
Public Works Building	889,685	1,982,640
Public Works Building and Quarry	3,582,497	4,550,191
Sojourner Truth Ulster Landing Park	110,972	150,702
Trudy Resnick Farber	1,465,704	2,705,888
UCAT	2,194,879	4,314,693
UCLEC (Law Enforcement Center)	29,250,950	55,533,502
Van Dale Garage - Fabrication Shop	568,597	896,488
Grand Total	**66,339,923**	**125,039,429**

Table 10: National Average Source-Site Ratios used in Portfolio Manager

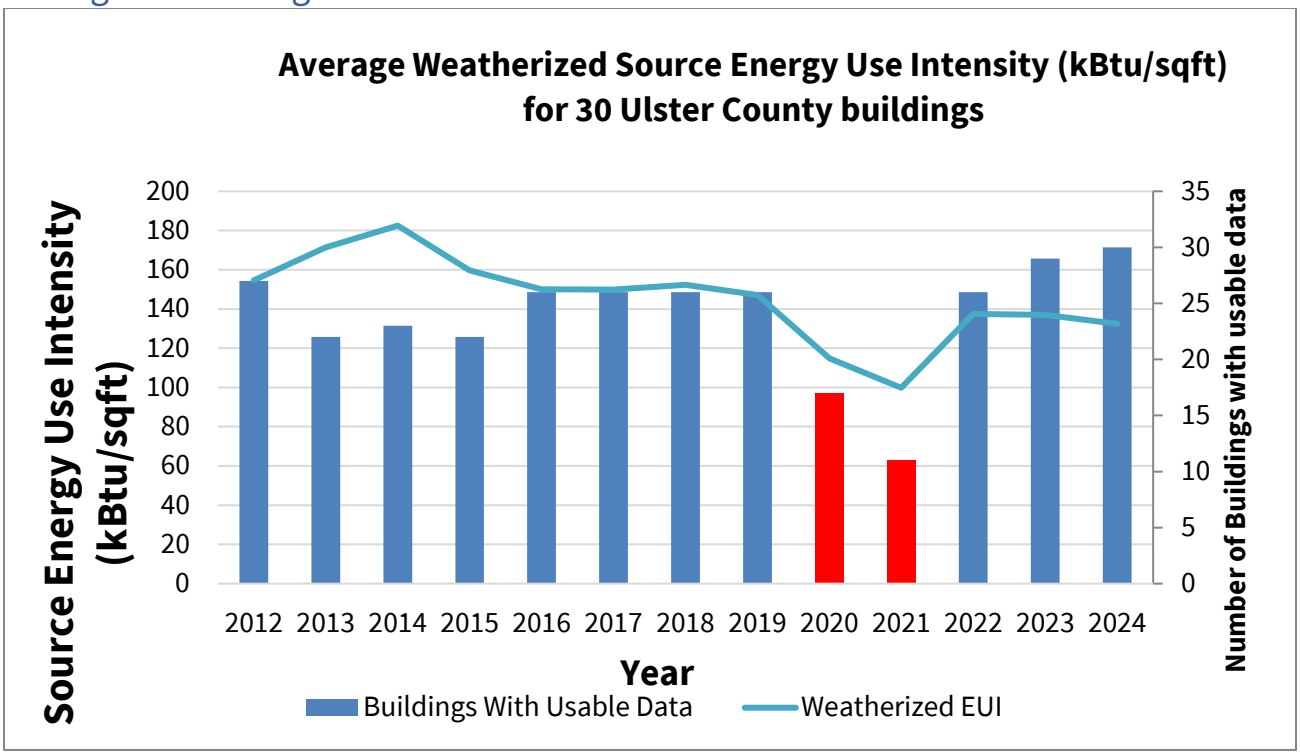
Fuel Type	Source-Site Ratio (Source kBtu/Site kbtu)
Electricity (Grid Purchase)	2.80
Electricity (On-site Solar)	1.00
Natural Gas	1.05
Heating Oil (No. 2)	1.01
Propane	1.01
Diesel	1.01

Appendix D: Visualization of Data Gaps in Annual Trends (2012-2024)

Weather Normalized Energy Usage Trends (Source EUI)

Data gaps are present in 2020 and 2021 as a result of Central Hudson implementing a new customer billing system that contained data inconsistences and gaps. Therefore, year-over-year analysis of Weather Normalized EUI could not be completed. Nevertheless, Weather Normalized EUI shows a declining trend over time, indicating improvements to energy efficiency in Ulster County buildings (Figure 2).

Figure 2: Average Weather Normalized Source EUI and Available Data Points



The average annual Weatherized Source EUI is shown here in the blue line and on the left y-axis. The annual average Weatherized EUI peaks in 2013 at over 180 kBtu/sqft. The number of buildings included in each year's average is shown with bars and on the right-hand y-axis. Weatherized Source Energy Use Intensity trends downwards between the years 2012 and 2024.

In years with limited building data, the average EUI is less reliable. Because some buildings use much more energy per square foot, the omission of a few buildings can dramatically skew the average annual EUI. The years 2020 and 2021 suffer from limited data sources, which skew the EUI average trendline, making it appear as though buildings became more efficient. The years 2022-2024 mark a return to consistent data.

Appendix E: Relevant Ulster County Plans and Electrification and Energy Conservation Projects

**Projects are not a compilation of every and all measures taken by Ulster County towards energy conservation improvements, building upgrades and electrification infrastructure expansion, but are highlights and examples of ongoing efforts.*

Annual Reports: The Ulster County Department of the Environment, with coordination from the Department of Public Works and other relevant departments, provides the following annual reports:

- **Green Fleet Report**: The Green Fleet Report documents the fuel use and emission associated with the County's vehicle fleet. Annual reports dating back to 2015 are published at https://www.ulstercountyny.gov/Departments/Environment under "Reports and Publications."

- **Building Energy Benchmarking Report:** The Building Energy Benchmarking Report documents the energy use and emissions associated with the County's building portfolio. Annual reports dating back to 2016 are published on the Department of the Environment website.

- **Government Operations Greenhouse Gas Emissions Inventory Report:** the Government Operations Greenhouse Gas Emissions Inventory Report documents a comprehensive greenhouse gas inventory for the county government's operations and is based on the methodologies and data provided from the Green Fleet and Building Energy Benchmarking Reports. Annual reports are published on the Department of the Environment website.[7]

2019 Government Operations Climate Action Plan (CAP): The 2019 CAP provides an implementation roadmap for energy use reduction and renewable energy projects across County government operations. County Executive Jen Metzger's Executive Order No.1 of 2023 (EO1-23) additionally commits the County government to reducing GHG emissions in alignment with the 2019 New York State Climate Leadership and Community Protection Act ("NYS Climate Act") and establishing GHG emissions reduction goals of 40% by 2030 and 85% by 2050, with an interim target of 25% by 2025. The Government Operations CAP is viewable on the DoE's webpage.

Onsite Energy Manager Final Report: This report is a culminating deliverable from the NYSERDA On-site Energy Manager (OsEM) Program which occurred in 2023 and 2024 and by which the County was provided services by an On-site Energy Manager through a contract with Guth DeConzo Consulting Engineers P.C. The project was 75% funded via NYSERDA and 25% funded by Ulster County. The project supported the improvement, operations, and performance of various mechanical and electrical equipment, and will ultimately result in energy savings for County government operations. The OsEM Project additionally provided oversight, coordination, savings and cost estimates, documentation of progress, and measurement and verification of energy savings for the 2024 calendar year, with a goal of achieving an annual savings of 6% of the total utility usage across County facilities (Appendix H).

[7] The total annual GHG emissions from the operation of Ulster County buildings may differ from the emissions total from the Buildings & Other Facilities sector in the Ulster County Greenhouse Gas inventory due to the exclusion of "Other Facilities" from the Benchmarking report, which do not have a gross floor area greater than 1,000 square feet.

Building Management System (BMS) Control & HVAC Upgrades & Electrification: The BMS System Control Upgrades is a $5.48 million project included in the County's 2025 – 2029 Capital Program. This project aims to implement the recommendations of the Ulster County Department of Public Works (DPW) in conjunction with findings from the *NYSERDA On-Site Energy Manager Final Report* to upgrade the building management systems (BMS) for nine properties of the County building portfolio. There are several HVAC systems upgrades and/or electrification projects underway or planned, including at the new Ulster County Wellness Center (368 Broadway, Kingston) and the Restorative Justice Center (733 Broadway, Kingston). (Appendix H)

Ulster County Area Transit "Bus Garage of the Future": Ulster County Area Transit's "Bus Depot of the Future" first became operational in 2005. The two phase NYPA managed electrification project launched in 2020 and includes 12 DC (level 3) fast charging stations, four dual level 2 charging stations, five electric buses and other EVs, a 204kW DC rooftop solar system for renewable electricity, and a 400kW back-up generator for resiliency in case of power outages. Utility service was upgraded, and the project is "futureproofed" to accommodate additional buses and chargers (both fast charge and Level 2 chargers). The electrification project is anticipated to be completed in 2025.

The "Bus Depot of the Future" project is supported by NYSERDA, NYS Department of Environmental Conservation, Dormitory Authority and the EV Make Ready program funding.

Solar Assessments and Installations: Solar assessments are ongoing at County facilities. In 2024, assessments were completed at 8 County buildings:

- 368 Broadway (UC Wellness Center)
- Department of Social Services (Development Court)
- Ulster County Fairgrounds Pool Pump House
- Emergency Management 911 (Golden Hill)

And are planned or in progress at the following locations:

- Department of Public Works
- Hall of Records
- Trudy Resnick Farber Center
- Emergency Communications Center

Onsite solar energy production systems will serve to offset onsite electricity consumption and reduce the amount of grid-supplied electricity purchased, thereby increasing localized renewable energy production.

Electric Vehicle (EV) Charging Infrastructure: The County's Sustainable Green Fleet Policy requires that a minimum of 20% of the fleet by 2025 are green vehicles, with at least 20% of those being zero-emission, and that after 2025, 100% of passenger and light duty truck vehicles purchased, leased or otherwise obtained will be zero-emission vehicles where technically feasible. The County continues to electrify the County vehicle fleet and several projects are underway to install EV charging stations and continue to expand both the fleet and public EV charging station networks located at County facilities.

EV infrastructure installations are planned for 2025 at 6 Ulster County government-owned locations:

- 368 Broadway (UC Wellness Center)
-Department of Public Works
-Department of Social Services (Development Court)
-Joys Lane (Kingston Building Complex)
-Trudy Resnick Farber Center
-Ulster County Law Enforcement Center (UCLEC)

The County received delivery of a Beam EV ARC mobile charging station (with integrated battery and solar panel) in September 2024. This unit was initially placed at the County's Development Court facility and was then moved to the Ashokan Station trailhead parking lot. The purchase of the Beam EV ARC unit was largely funded via a Federal Department of Energy, Energy Efficiency Community Development grant allocation.

LED Lighting Retrofits: A large project spanning 2023-2024 converted over 1,000 lights and several hundred switches in the County's Department of Social Services (Development Court). This conversion from fluorescents to LEDs is expected to result in significant energy savings as well as an estimated total annual cost savings of $31,500.

Building Weatherization: The Ulster County Department of the Environment is headquartered at 17 Pearl Street in Kingston. A project completed in 2024 included a comprehensive air-sealing initiative targeting the building envelope as well as upgrades in insulation. A NYSERDA Clean Energy Communities Program grant largely funded the work.

Whole Building Retrofit of Trudy Resnick Farber Center: Ulster County is moving forward with plans to enhance the infrastructure and accessibility of the Trudy Resnick Farber Center, located in Ellenville. A major redesign of the kitchen, dining room, and entrance will create a welcoming, public-facing section of the building for multipurpose community use. Design work is expected to be completed in late 2025, with construction beginning in 2026. Energy- related upgrades include the installation of eight EV charging stations, heat pumps, a new roof, and a rooftop solar array — supported by a NYSERDA grant. The EV chargers are anticipated to be completed in 2025, with other improvements phased in through 2026.

More details about Trudy Resnick Farber Center can be found at:
https://www.ulstercountyny.gov/Facilities/Trudy-Center .

Ulster County Emergency Communication Center (New Paltz): The County is in the process of constructing a new Emergency Communications Center (ECC). The 16,350-square-foot ECC, located on Paradies Lane in New Paltz, will house the Department of Emergency Services, including the Emergency-911 Center, which operates 24/7, an Emergency Operations Center to provide a rapid, coordinated response to natural disasters and larger emergencies, and the Divisions of Fire Services and Emergency Medical Services.

In 2025, Ulster County was awarded a $2 million NYSERDA grant to support the facility's energy-conscious design, including super-insulated walls, geothermal heating and cooling, and rooftop solar with battery backup. A substantial portion of the property will also be dedicated to a ground-mounted solar array to power 100% of this facility and as well as other County buildings. Learn more about this exciting project on the County's website.

Golden Hill Penrose Project: This $87 million project involves a multi-use development complex at the former closed County jail site at Golden Hill in Kingston, NY. The development features all-electric buildings designed to meet the highest energy efficiency and green design standards, including a 700-kilowatt rooftop solar system funded through a Department of Environmental Conservation Climate Smart Communities Grant secured by the County.

The Golden Hill project will unlock underutilized development potential, acting as a catalyst for meeting the housing goals outlined in the City of Kingston 2025 Comprehensive Plan and the Ulster County Comprehensive Plan as detailed in the 2005 Priority Strategies to Support Housing Development in Ulster County report and create a new neighborhood on the site of the Old Jail. Residents will also benefit from free broadband internet, childcare, a community garden, playgrounds, and a fitness center.

The project received a $10 million award from Governor Hochul's inaugural Mid-Hudson Momentum Fund, as well as funding from multiple state and federal sources. More details about this innovative project can be found on the project website.

Appendix F: Ulster County Buildings List

The following table includes a full list of all County owned or operated buildings in 2024. Buildings are sorted first by inclusion in the 2024 report and secondly by alphabetical order.

Table 11: Ulster County Buildings List

Included in 2024 Report?	Building Name	Address	Floor Space (sqft)	Ownership Status	Notes and/or Reason for Omission from 2024 Report
Yes	21 Elizabeth St	21 Elizabeth Street, Kingston	5,742	Owner	Energy use for 21 Elizabeth is not included in building averages because the building remains unoccupied.
Yes	368 Broadway	368 Broadway, Kingston	31,683	Owner	Square footage updated in 2024 report to match DPW records, allowing for accurate EUI reporting. Total building square footage is now 31,683 sqft instead of 1,000 sqft. (U.C. Wellness Center)
Yes	Board of Elections	79 Hurley Ave. Kingston	12,511	Lessee	2024: Added building. A new submeter was installed in 2023 allowing for accurate use data of the property.
Yes	Carr Building (1 Pearl Street)	1 Pearl Street, Kingston	5,438	Owner	
Yes	County Office Building Complex	244 Fair Street, Kingston	62,396	Owner	
Yes	County Pool / Fairgrounds	241-249 Libertyville Road, New Paltz	7,126	Owner	
Yes	DSS / Development Court	1 Development Court, Kingston	117,977	Owner	
Yes	Emergency Management 911	238 Golden Hill Dr, Kingston	3,537	Owner	
Yes	Environment (17 Pearl Street)	17 Pearl Street, Kingston	4,229	Owner	
Yes	Golden Hill Office Building	239 Golden Hill Drive, Kingston	39,600	Owner	
Yes	Hall of Records	300 Foxhall Ave., Kingston	22,550	Owner	
Yes	Highway Substation - Accord	456 Granite Road, Rochester	2,324	Owner	
Yes	Highway Substation - Boiceville	8 Cabin Hill Road, Olive	13,690	Owner	
Yes	Highway Substation - Plattekill	227 Fosler Road, Plattekill	2,265	Owner	

Included in 2024 Report?	Building Name	Address	Floor Space (sqft)	Ownership Status	Notes and/or Reason for Omission from 2024 Report
Yes	Highway Substation - Saugerties	344 Harry Wells Road, Saugerties	3,552	Owner	
Yes	Highway Substation - Shandaken	7336 State Rt. 28, Shandaken	5,364	Lessee	
Yes	Highway Substation - Shawangunk	40 King's Ln., Shawangunk	4,433	Owner	
Yes	Highway Substation - Sundown	30 Greenville Road, Denning	4,984	Owner	
Yes	Highway Substation - Ulster Heights	229 Ulster Heights Road, Wawarsing	3,545	Owner	
Yes	Hutton Building	234 Golden Hill Lane	3,386	Owner	
Yes	Information Services	25 South Manor Ave., Kingston	13,174	Owner	
Yes	Persen House	74 John Street, Kingston	6,405	Owner	
Yes	Probation (Restorative Justice Center)	733 Broadway, Kingston	20,724	Owner	
Yes	Public Safety Training Center	250 Ulster Landing Road, Kingston	6,804	Lessee	
Yes	Public Works Building	313- 317 Shamrock Ln, Kingston	10,740	Owner	
Yes	Public Works Building and Quarry	317 Shamrock Ln, Kingston	35,000	Owner	
Yes	Sojourner Truth Ulster Landing Park	916 Ulster Landing Road, Kingston	3,198	Owner	
Yes	Trudy Resnick Farber	50 Center Street, Ellenville	20,732	Owner	
Yes	UCAT	1 Danny Circle, Kingston	23,413	Owner	In the 2024 report, energy usage from EV Connect electric vehicle chargers is properly deducted from UCAT's electricity usage, allowing for accurate data from building energy use.
Yes	UCLEC (Law Enforcement Center)	380 Boulevard, Kingston	277,000	Owner	
Yes	Van Dale Garage - Fabrication Shop	316 Van Dale Road, West Hurley	15,146	Lessee	
No	701 Grant Avenue	701 Grant Avenue	--	Owner	Formerly owned by County from Jan-2023 to July-2024
No	Boices Lane, Le Kingston Trois	535 Boices Lane, Town of Ulster	10,287	Lessee	

Included in 2024 Report?	Building Name	Address	Floor Space (sqft)	Ownership Status	Notes and/or Reason for Omission from 2024 Report
No	Department of Health - W.I.C.	230 Aaron Court, Kingston	2,917	Occupied	No metered energy use data
No	DPW New Warehouse (Ulster)	1711-1715 Ulster Avenue, Town of Ulster	12,048	Owner	Not previously metered
No	Family & Child Advocacy Center of U.C.(DSS)	51 Hurley Avenue, Kingston	3,328	Occupied	Leased Space without Metered Energy
No	Former Board of Elections	284 Wall St, Kingston	3,566	Occupied	Leased Space without Metered Energy
No	Golden Hill Pump House	44 Golden Hill Drive, Kingston	N/A	Owner	Accessory Infrastructure
No	Golden Hill Water Tower	733 Broadway, Kingston	N/A	Owner	Accessory Infrastructure
No	Highway Substation - New Paltz	246 Libertyville Road, New Paltz	13,697	Owner	Limited energy data due to meter errors.
No	Office of Employment and Training	521 Boice's Lane, Kingston	10,287	Occupied	Leased Space without Metered Energy
No	Probation Department	124 Main Street, New Paltz	1,308	Occupied	Leased Space without Metered Energy
No	Public Defender	280 Wall Street, Kingston	4,848	Occupied	Leased Space without Metered Energy
No	Sheriff's Substation Mt. Tremper	146-152 Mt. Pleasant Road, Mt. Tremper	2,004	Occupied	Leased Space without Metered Energy
No	Sheriff's Substation Port Ewen	Esopus Town Hall, Salem Street	N/A	Occupied	Leased Space without Metered Energy
No	Sheriff's Substation Shandaken	Town Hall, Rt. 28	N/A	Occupied	Leased Space without Metered Energy
No	Sheriff's Substation Wallkill	1500 Rt. 208, Wallkill	711	Occupied	Leased Space without Metered Energy
No	Sheriff's Impound Yard	1 Maxwell Lane, Town of Ulster	28,125	Occupied	Leased Space without Metered Energy
No	Sherriff Substation - Ellenville	155 Airport Road, Ellenville	1,534	Occupied	Leased Space without Metered Energy
No	SUNY Ulster at Kingston	94 Marys Avenue, Kingston	30,830	Owner	Leased to SUNY Ulster; Included from 2016 to 2018; removed starting in 2019.
No	Tech City	300 Enterprise Drive	--	N/A	Not owned or occupied by County; Briefly owned by UC Econ Devel Alliance before transfer to iPark 87.
No	Ulster County Courthouse	285 Wall Street, Kingston	43,650	Owner	Temporarily excluded. Construction beginning in 2024.
No	Veteran's Transitional Housing Facility	67 Wurts Street, Kingston	6,656	Owner	No data; Included in reports from 2016 to 2021; Removed from reports starting in 2022.

Appendix G: Resolution No. 447 of 2016

Resolution No. 447 October 18, 2016

Establishing A Policy To Require Annual Public Reporting Of Building Energy Consumption And Benchmarking Information For County Owned Buildings

Referred to: The Energy and Environment Committee (Chairman Richard Parete and Legislators Bartels, Heppner, Lapp, and Wawro)

Legislators James H. Delaune and Kevin A. Roberts and Legislators Bartels, Greene, Heppner, Lapp, R. Parete and Wawro offer the following:

WHEREAS, Ulster County has distinguished itself as an environmental leader through numerous environmental actions including earning designation by NYS as a Bronze Certified Climate Smart Community; and

WHEREAS, per Executive Order No. 1-2016, Ulster County purchases renewable energy credits ensuring all our electricity comes from renewable sources, received a Green Power Leadership award from the United States Environmental Protection Agency (EPA) and is recognized by the Unites States EPA one of the top municipal green energy purchasers in the country; and

WHEREAS, the County further demonstrates leadership on climate protection by purchasing carbon credits to offset all remaining greenhouse gas emissions associated with operations resulting in a net carbon neutral government operation; and

WHEREAS, per Executive Order No. 1-2016 the County Executive committed to reducing- through conservation, efficiency and renewable generation- the GHG emissions associated with operations by 25% by 2025 and 80% by 2050 over the 2012 baseline; and

WHEREAS, since 2012 government efficiency and restructuring efforts have resulted in over a 20% reduction in electricity use and an average savings of over $370,000 per year to tax payers; and,

WHEREAS, NYS Energy Research and Development Authority (NYSERDA) has announced a new Clean Energy Communities program which would allow the County access to significant grant funding to further implement clean energy actions reducing both energy costs and greenhouse gas emissions; and,

WHEREAS, the Clean Energy Communities program requires that the County implement certain High-Impact Actions; and

WHEREAS, one of the High-Impact Actions requires the legislative establishment of a policy requiring the public reporting of building benchmarking and energy consumption; and

Resolution No. 447 October 18, 2016

Establishing A Policy To Require Annual Public Reporting Of Building Energy Consumption And Benchmarking Information For County Owned Buildings

WHEREAS, the County already has instituted an operational practice of tracking all building energy use and producing reports; now, therefore be it

RESOLVED, that it is the policy of Ulster County to continue to collect energy use data for all fuel types used, on a monthly basis where possible, on all buildings greater than 1,000 square feet in size that are owned or occupied by the County of Ulster as well as data documenting property use; and, be it further

RESOLVED, that the County will maintain records as necessary for carrying out the purposes of this Local Policy, including but not limited to energy bills and other documents received from tenants and/or utilities and such records shall be preserved by the County for a period of at least three (3) years; and, be it further

RESOLVED, that the County will make publically available on the internet no later than September 1st of each year annual summary statistics, as well as a comparison of the annual summary statistics across calendar years for all years since annual reporting under this local policy has been required for all the buildings, for each covered building for the pervious calendar year including Energy Use Intensity (EUI), weather normalized source EUI, annual greenhouse gas emissions, an energy performance score where available, and other information as required by EPA Portfolio Manager or deemed appropriate by the County,

and moves its adoption.

ADOPTED BY THE FOLLOWING VOTE:

AYES: 20 NOES: 0
(Absent: Legislators Delaune, Gerentine, and Maloney)

Passed Committee: Energy and Environment as amended on October 12, 2016

FINANCIAL IMPACT:
NONE

Resolution No. 447 October 18, 2016

Establishing A Policy To Require Annual Public Reporting Of Building Energy Consumption And Benchmarking Information For County Owned Buildings

STATE OF NEW YORK
. ss:
COUNTY OF ULSTER

I, the undersigned Clerk of the Legislature of the County of Ulster, hereby certify that the foregoing resolution is the original resolution adopted by the Ulster County Legislature on the 18th Day of October in the year Two Thousand and Sixteen, and said resolution shall remain on file in the office of said clerk.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of the County of Ulster this 19th Day of October in the year Two Thousand and Sixteen.

|s| Victoria A. Fabella
Victoria A. Fabella, Clerk
Ulster County Legislature

Submitted to the County Executive this 19th Day of October, 2016.

|s| Victoria A. Fabella
Victoria A. Fabella, Clerk
Ulster County Legislature

Approved by the County Executive this 24th Day of October, 2016.

|s| Michael P. Hein
Michael P. Hein, County Executive

Appendix H: Onsite Energy Manager (OsEM) Report, Executive Summary

Ulster County New York

NYSERDA On-Site Energy Manager

Final Report

Prepared by:

Guth DeConzo Consulting Engineers, P.C.

January 2025

GUTH DeCONZO
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1. Executive Summary

The OsEM project identified a large number of issues within UC buildings that lead to excessive energy usage that are listed below.

- Larger UC buildings that have existing BMSs where not scheduled to operate heating, cooling, and in some cases lighting, in unoccupied modes during hours of limited or no occupancy.
- UC will need to implement work started during the OsEM project to have consistent temperature setpoints throughout each building, and county wide within building types, to maximize energy efficiency and limit staff complaints.
- Smaller UC buildings generally have manual thermostat control for heating and cooling systems with most of these buildings not scheduled for unoccupied operation.
- BMSs in several of the buildings are outdated and offer limited functionality to implement energy conservation measures. The OsEM project worked with DPW staff to develop an RFP to upgrade the BMSs in most of these buildings.
- The OsEM project uncovered significant shortcomings in the implementation of existing service contracts between UC and the three BMS contractors serving these buildings. Some of the items below that are being worked on by the end of the OsEM project include:
    - Determine any equipment in a buildings HVAC system that is not being covered by the BMS contractor in their interpretation of the UC Service Contract. o Gather written information from each BMS contractor as to how they are meeting each aspect of the Schedule A Scope of Services contract including:
    - Detailed list of equipment covered and not covered by the contract.
    - Detailed list of hardware and software versions for each BMS system and
    - "System Firmware Versions" that have been updated (including dates) detailed in contract section 15 of Schedule A Scope of Services.
    - Inspection reports for each equipment type including inspection frequency, testing procedures, data points/component tested, and changes made to "ensure the efficient and reliable operation" of equipment detailed in contract section 6 of Schedule A Scope of Services.
    - Service reports provided to UC after each service visit including how the problem was identified (ie; UC staff request, BMS contractor testing), work performed, and any schedule for follow-up work to complete tasks.
    - Annual schedule by the BMS contractor for the "Energy Review Meetings" detailed in contract section 13 of Schedule A Scope of Services.
    - Annual schedule by the BMS contractor for the "on-site training" detailed in contract section 18 of Schedule A Scope of Services.

    o Adjust language in the contracts so that it is clear what equipment is covered under these contracts and the expectations for the work as needed.

    o Ensure that the BMS Upgrades project includes IT work so that necessary UC staff will have computer workstations available with all the building's BMSs for monitoring alarms and general operation. Each BMS should also include power meters for electricity and fuel to allow for regular monitoring of energy consumption.
- ECMs identified electrical savings across all UC buildings of approximately 19% and fuel savings of 25%, totaling approximately $384,000 annually. Implementation numbers exceeded the 3% target for each type of energy sought by the project, totaling $111,900 annual savings.

2. Summary of Activities

2.1 Energy Management Plan

The initial quarterly report included the Energy Management Plan, which outlined the scopes of the OsEM project including project and campus building overview, roles and responsibilities of all parties involved, meeting and reporting requirements, energy consumption tracking, and project schedule. (Appendix 1.1)

2.2 Building Temperature Setpoint and Scheduling Report

The initial report issued in July 2023 to address the lack of consistent and efficient heating and cooling temperature setpoints throughout the many buildings in addition to lacking unoccupied schedules for most buildings was estimated to save over $139,000 annually in energy cost. The cost to implement this work was estimated at the time to be $7000 which represented product cost for WiFi thermostats at several dozen buildings that still have manual thermostats in service. Programming work for BMS scheduling and setpoint changes as well as labor to install new thermostats was expected to be performed by UC staff at no cost. (Appendix 1.2)

2.3 Project Summary Sheet

The initial Project Summary Sheet (energy conservation measure (ECM) project tracking list) issued with the first quarterly report identified a long list of field sensors that were not reading accurately or building management system (BMS) control points that were not functioning to maximize energy efficiency. Multiple BMS work lists and reports were generated during this project detailing these required repairs for two controls contractors, Encon Services and EM Tech, currently serving the county. Conversations took place at multiple monthly team meetings concerning the existing service contracts between these two companies and UC, and how these contracts can be leveraged to get these lists repaired. These conversations allowed UC to determine that some of the identified problems were known to the BMS contractors but not being addressed.

The service contract with Encon Services provided the most information to UC on what has been occurring (or not occurring) under these service contracts. Encon Services were aware of some identified issues with sensors as well as buildings operating in a 24/7 occupied mode, but informed UC that they have made changes as UC staff has requested, despite any negative implications for increases to energy consumption. Encon Services also identified buildings where they did not consider large quantities of HVAC equipment under their contract responsibilities, and have not been servicing these problems, or providing documentation to UC to indicate that problems exist that are not being addressed. It was also determined that the service reports that have been provided to UC were not legible to determine what work has been performed. Corrections to the service reports had been made by the last quarter of the project. At the end of this project UC staff is attempting to acquire information from Encon Services detailing the work that they are doing under their service contract.

EM Tech has three buildings under their contract, but service records indicate that they are only making service visits upon request from UC staff for repairs and not on a regular

schedule as the contract specifies. There was equipment in Em Tech buildings that were not communicating with the BMS due to failed components or field changes over the years. Some of the OsEM identified issues were corrected during the last quarter of the project but some will require BMS equipment replacements to accomplish, which is also ongoing at the end of this project.

For much of the duration of the OsEM project, efforts to get identified ECMs implemented, either under current BMS contracts or by UC staff, had limited progress. The general slow speed of implementing changes for the county combined with Encon Services not being very cooperative with this work kept the final implemented numbers at a low level, leaving many opportunities for UC to continue this work. The final Project Summary Sheet is included at the end of this report (pages 12-19).

1.3 UC Capital Improvements Reports

The OsEM twice provided a document to include in the five-year Capital Improvement Report, with the 2023-28 one occurring in the first quarter of the project and the 2024-29 addition in spring of 2024.

1.4 UC Office Complex/DSS Lighting Upgrades

During the first and second quarters of the project, UC staff requested that the OsEM review the LED replacement design that was already in design for DSS. Testing was performed by the OsEM with the demonstration LED installation to verify that the airflow through the new fixtures was adequate, as the LED manufacturer had previously not manufactured this type of fixture. Changes were made to the ceiling occupancy sensors for this project to allow for a future low cost upgrades to include these sensors into the BMS for more efficient operation of the buildings RTUs and VAVs.

Also, during this time the OsEM was utilized to review the bid proposal for insulation upgrades to the Department of the Environment building.

1.5 UC Court House and Trudy Resnick Farber BMS Control

In the second quarter of the OsEM project two short reports were issued detailing how inaccuracy of outside air temperature sensors are causing control issues in operating the HVAC equipment. (Appendix 1.4 & 1.5)

1.6 UCLEC Airflow Control Issues

The second quarter included a report that was requested by UCLEC staff to evaluate air flow problems in two dorm spaces. The lack of proper exhaust airflow from the bath/shower area of the dorm has been an issue since the buildings construction and has caused excessive moisture in this area to cause rust on metal ceiling tiles. Testing in this report prompted UCLEC staff to find and repair ductwork that was never connected to the ceiling diffusers, correcting the exhaust airflow problem.

A second report for UCLEC was issued during the 3rd quarter covering the airflow and pressure controls in the four isolation rooms in the medical clinic. The report detailed the

lack of proper control occurring with the original equipment, and prepared a scope of work and contractors' quotations for a systems upgrade that will provide more long-term accuracy in operation then the existing system provided.

1.7 UCLEC HVAC System Control

The report for UCLEC detailed extensive energy savings possible through reversing the current temperature setpoints in the building that has the cooling temperatures much lower than heating temperatures. Additional savings were identified returning some of the facilities 40 air handling units (AHUs) to the original sequence reducing airflow during unoccupied hours as well as reverting the face & bypass dampers to original operation. Getting all the AHUs to operate economizer control consistently also added to an estimated savings of $202,000 annually. It is expected that most work would be BMS programming performed under the existing BMS contract or by UC facilities staff. The report identified larger work estimates that include adding VFD controls to AHUs-22-25 as well as calibrating all room DP and airflow station transmitters that account for about 80% of the BMS contractor estimate of $92,000 to implement these changes. (Appendix 1.6)

1.8 UC Area Transportation HVAC Control Report

This report identified minor energy savings of approximately $4000 annually due to the small percentage of the building that has heating and cooling systems already had equipment scheduled to be off during unoccupied hours, with building temperatures more efficient than most buildings. Minor changes to the operation for the two AHUs serving the office spaces were recommended in addition to a control upgrade for AHU-1 that would allow for isolation for the dispatch office area that maintains second shift hours while the remainder of the building is unoccupied. (Appendix 1.7)

1.9 UC Office Complex/DSS HVAC Control Report

This building had four separate reports issued with the extensive issues identified in the operation of this building, with the last two prompted by the BMS contractors' continuous insistence that there was nothing wrong with the HVAC system operation. The initial report, and subsequent revision, identified an estimated $82,000 in annual energy savings. The savings were primarily due to the existing 31 roof top heating and cooling units (RTUs) operating as if the building was occupied 24/7, and temperature setpoints not being efficient. Two follow-up supplemental reports for this building were necessitated in 2024 to show the BMS contractor that the trend data from their BMS continued to show the same issues that are leading to inefficient HVAC system operation. In addition to the HVAC system never running in a reduced unoccupied mode, the BMS trend data showed RTUs regularly operating in both heating and cooling modes, outside air and bypass dampers not operating to the BMS settings, and the economizer control not controlling well. Due to the limitations of this outdated BMS system, only 9 of the 31 RTUs had trend data available, which raised the serious concern that these many identified issues only scraped the surface of the building's problems. Additionally, there are approximately

162 variable air volume boxes (VAVs) that control airflow and temperature to smaller zones that showed no indications that they were moving. (Appendix 1.8)

1.10 Golden Hill Office Building HVAC Control Report

The report for Golden Hill Office Building detailed that even though the buildings was running 24/7 in occupied mode, and temperatures in the spaces were rather inconsistent, the energy use was 26% lower than national average for office buildings. The heat pump system that provides heating and cooling are the reason that despite operating the building in an inefficient manner, that building is still efficient compared to the national average. Scheduling the building's 50 heat pumps, as well as AHU-1 that provides fresh air for the building, combined with getting the lighting control system functional to keep all the interior lights from running 24/7, provided an estimated savings of $31,000 annually. During the implementation phase for this building the control panel controlling AHU-1, and providing the outside air temperature for the BMS (which is the input to control other HVAC equipment), was repaired after being out of service since prior to this project. Also it was determined that only 5 of the 15 lighting circuits were functioning, so the savings for scheduling the lights off during unoccupied hours was reduced by approximately 67%. (Appendix 1.9)

1.11 DPW HVAC Control Report

The report for the DPW building detailed an HVAC system similar, but much smaller than Golden Hill, with 30 heat pumps and one AHU (Heat Recovery Unit HRU-1) providing fresh air to the building. Unlike Golden Hill however, DPW is 43% higher than the national average for office buildings. The report estimated annual energy savings of $3500 by scheduling equipment for unoccupied operation with temperature setbacks. It was determined during the attempts to implement these scheduling changes that one of the control boards in the mechanical room had failed, requiring replacement before this programming work can occur. (Appendix 1.10)

1.12 UC Community College HVAC Control Report

The report covered the fact that the building has rather limited hours off occupation for much of the building, only the main RTU-1 and the lighting are controlled for unoccupied operation. Like other UC buildings the space temperatures during the cooling season is slightly lower than the heating season temperature. Making setpoint and scheduling changes for individual zones, utilizing existing CO2 controls for demand control within the zones, and changing zone sequence of operation for both UVs and fin tube heating are estimated to save approximately $28,000 annually. UC does not currently pay the utility bills for this building, so implementation of identified energy measures were not pursued during the OsEM project. (Appendix 1.11)

1.13 UC BMS Upgrade RFP

UC has determined during the OsEM project that the multitude of issues with the existing

BMSs at nine of eleven buildings, that replacement is necessary. The two buildings with BMS controls installed and serviced by Eastern Heating & Cooling are not included in this RFP, as UCLEC was upgrading all the field controllers at the end of the OsEM project, and UCAT is a relatively new system. Of the nine remaining buildings Probation/Restorative Justice was already in the design and bidding phase of replacing the entire HVAC equipment including the BMS. The eight buildings remaining in the RFP include the following:

Building Name	Hardware Point Total	Software Point Total
DPW	134	425
Golden Hill OB	256	841
Medical OB - 368 Broadway	154	568
Records Storage	169	537
Trudy Resnick Farber	131	368
UC Court House	897	2245
UCOB	365	924
UCOC - DSS	1243	4103
TOTALS	3448	10266

The OsEM prepared the specification section for the RFP which resulted in a 300+ page document to cover the extensive quantities of equipment in these buildings. UC plans to implement this project over a three-year period starting with the buildings with the most potential energy savings that will be generate with functioning BMSs.

1.14 Commissioning Documentation

Included in the 5th and 6th Quarter Reports commissioning spreadsheets were developed for 11 buildings that includes the ECMs identified in the Project Summary Sheet to allow for proper tracking of changes during this project and for UC into the future months. These spreadsheets were update as work was performed in some of the buildings, with the final versions included in this report (Appendix 1.12) and added to the UC sharepoint "Building Energy & Green Fleet" in the location listed below:

Documents - PROJECTS - On-Site Energy Manager Documents - Commissioning Spreadsheets

1.15 Energy Tracking & Monitoring

There were no buildings that have existing meters in service to include electrical usage or fuel usage that are connected into the BMSs. Monitoring is currently an annual exercise when UC files their annual Benchmarking report to the US EPA. The specifications for

the BMS Upgrades RFP included both electrical power meters and gas meters for each building so the UC can have an energy dashboard implemented for each building.

1.16 Meeting Minutes

Meeting agendas and minutes for the duration of this project will be includes in Appendix 1.13.

2.0 Methodology

1. The purpose of OsEM is to improve the operations and performance of various mechanical and electrical equipment for UC that will result in energy and operation savings. For the UC engagement, the OsEM has been working approximately 20 hours per week for an 21-month period. The UC buildings were visited on a regular schedule, with larger buildings having regular field visits, and on as as-needed basis for the other smaller buildings. The project was originally scheduled for an 18-month period, but it was extended by three months to allow for implementation of some ECMs.

2. The role of the OsEM is to provide oversight, coordination, savings and cost estimates, documentation of progress, and measurement and verification of savings. Due to most of the ECMs being implemented during the final three months that the project was extended for, verification was reduced to short trending periods after implementation. For the OsEM to be effective, all parties must actively participate, including UC management and staff, and building management system contractors.

3.0 Modifications to Standard Operating Procedures

Two of the primary objectives of the OsEM project are implementation of ECMs and utilizing any existing energy monitoring system so that UC staff will use it on a continuous basis to identify energy waste within individual buildings. UC DPW staff was very slow to become engaged in the OsEM project that originated within the Department of the Environment, with work to implement ECMs primarily occurring in the last few months. This combined with UC getting limited work, delays, and obstruction, from the controls contractor that controls five of the ten buildings with existing BMSs, made for very limited implementation of ECMs. The staff at most buildings have limited interaction and familiarity with the existing BMSs due to its age and lack of functionality, so ECM changes required working with the BMS contractors. Also, there were no existing energy monitoring systems in these BMS buildings to utilize, so that work did not occur.

Another issue that limited the OsEM project progress in some buildings was that often other larger problems with the BMS were identified during attempts to implement ECMs. These problems included contractors not servicing all equipment in a building, (interpreting their contract to not include certain equipment), or failed controls keeping ECMs from being implemented without other repairs occurring first. The existing contracts with the controls contractors to maintain the buildings running in an efficient manner were not well understood by either the contractors or UC staff, which has led to obvious problems within some buildings not being identified and repaired.

Encon Services is contracted by UC to maintain the BMS and HVAC equipment at the UC Court House, Trudy Resnick, Records Storage, UCOC/DSS, and Probation/Restorative Justice. Though commissioning spreadsheets and direct communications between UC staff, the OsEM, and Encon Services concerning their BMS deficiencies took place over the last few quarters, few repairs have been confirmed in writing to UC staff. This has prompted UC staff to request written details from Encon Services as to the maintenance procedures that are performed to meet their service contract as well as requests for UC staff to accompany Encon Service technicians on field visits to observe this work. At the time of this report, UC has not received a response from Encon Services.

Some BMS repairs and ECM implementation occurred under the EM Tech contract in the buildings that they cover, UCOB, Golden Hill OB, and DPW. During this work and UC staff review of invoicing from EM Tech it was realized that EM Tech was treating the contract more as an on-call service contract and not the maintenance contract as written. Though UC was not getting invoiced for work not performed, each building had BMS repair issues that the OsEM project identified that routine maintenance should have identified and addressed. Several of these repairs remain open at the time of this report.

Eastern Heating & Cooling provides BMS contracted service for UCLEC and UCAT buildings. There was extensive savings identified at UCLEC primarily due to heating and cooling temperature settings being reversed from efficient values, and some air handling units running full speed 24/7 though originally set to reduced speed during low or unoccupied hours for the spaces they served. The ECM implementation for UCLEC was put on hold until the end of the OsEM project, as upgrades to all the BMS controllers in the building has been occurring since the fall 2024. At the time of this report plans are being made to implement as many ECMs as possible at the end of January 2025 as the OsEM project concludes.

The one deviation to standard operating procedures undertaken by the OsEM was not having ECMs interactive with other measures within the building. With a list of ECMs into the hundreds, it was determined that the estimated savings for each ECM would provide realistic savings numbers without spending time redoing each buildings ECM calculation every time a new one was added for that building.

3.1 OsEM Project Contact List

Team Member	Company and Contact Names	Phone Number/ Contact Information
Owner	Ulster County	
Director – Dept of the Environment	Europa McGovern	(845) 802-7978
Maintenance Coordinator – Dept. of Public Works	Ed Vertullo	(845) 340-3142

Deputy Commissioner – Finance	Dean Rylewicz	(845) 340-3127
Deputy Commissioner – Buildings & Grounds	Leo Maneri	(845) 340-3975
Deputy Commissioner – Capital Projects	Rob Parete	(845) 340-3116
OsEM	Guth DeConzo	
On Site Energy Manager	Dan Spilman	(518) 488-9406 (c)
Mechanical Engineer	Jeremy McDonald	(518) 266-9600 ext. 101
Electrical Engineer	BouJeloud Reed	(518) 266-9600 ext. 106

4. Energy Conservation Measures and Tracking

4.1 Energy Conservation Measures Project Summary

1. The final list of ECMs is included in Appendix 1.3. Final identified electrical savings totaled 23% of UC baseline consumption, 766% higher than the 3% OsEM target. Final identified fuel savings ECMs was 29% of UC baseline consumption, 985% higher than the 3% OsEM target. Installed or implemented ECMs were below the 3% savings targets for both electric and gas, and will be updated in the appendix 4.1 at the end of the project. This ECM list includes many no cost and low cost measures that could be implemented by UC as staff and resources allow. Many ECMs will be addressed when the BMS Upgrade project occur at those buildings. Limited ECM implementation occurred during the OsEM project period due to reasons discussed previously. Work under the BMS Upgrade Project will also install energy monitoring system for each of the larger UC buildings with new meters and BMS software to allow UC staff to monitor these buildings' energy consumption.

2. The chart below provides a brief overview of each of the ECM types that are included in Appendix 4.1 Project Summary Form second column, titled "Measure Description".

Energy Conservation Measure Description	Energy Conservation Measure Overview
AHU Control	Correct AHU sequence of operation and/or equipment not functioning as designed.
BMS Temp Control	BMS scheduling and temperature setpoints.
BMS Upgrades	Add additional BMS sensors and/or controls.
Boiler Control	Sequence of Operation changes to maximize boiler and boiler pump efficiency.

Building Temperature Control	Setpoint and scheduling changes for buildings with stand-alone controls.
Chiller Control	Chiller outside reset control, cooling tower modulating control, BMS control upgrades.
DHW Pump Control	Install controls to eliminate 24/7 operation for domestic HW recirculation pumps.
EF Control	Install controls to eliminate 24/7 operation for equipment room EFs.
HVAC/Heating System	Equipment upgrade varies by ECM.
HW System Upgrades	Upgrades and replacement of heating system equipment.
HWP Control	Adjust HWP DP setpoints to allow for modulation of the HWP VFDs over a larger range.
Kitchen EF and Cooler Controls	Install kitchen hood controls for variable supply & exhaust air flow. Install cooler controls.
Lighting Upgrades & Controls	Upgrade to LED lighting and/or add lighting controls.
Pipe Insulation	Install insulation on piping, valves, and fittings that has no insulation or damages insulation.
Sensor Repair	Recalibrate or replace BMS sensors that are not reading properly.
Windows	Replace existing single glazed windows.

5.0 Supporting M&V, calculations, cost estimates

Savings calculation will be included for many of the identified ECMs in Appendix 5.1. Cost estimates for some ECMs are included in the Appendix 5.2 chart.

6.0 Case Study

A case study summarizing the OsEM project at UC will be provided to UC when completed by NYSERDA staff. The OsEM provided text to NYSERDA for the preparation of this document.

7.0 Road Map

A Road Map summarizing the process for UC to enroll in the OsEM project, and to positive and negative highlights of this project will be provided to UC when completed by NYSERDA staff. The OsEM provided text to NYSERDA for the preparation of this document