

City of Charlottesville Fiscal Year 2024 Annual Energy and Water Performance Report



City of Charlottesville FY2024 Annual Energy and Water Performance Report

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Introduction

The City of Charlottesville’s Energy and Water Management Program (EWMP) monitors and manages energy and water usage of the City’s municipal sites, including both local government and public schools. By taking intentional actions that improve efficiency, reduce reliance on fossil fuels, and decrease greenhouse gas emissions from municipal sites, the EWMP is focused on supporting **Charlottesville’s community-wide climate action goals to achieve a 45% reduction in greenhouse gas emissions by 2030 and carbon neutrality by 2050**. The EWMP tracks the energy and water usage at these municipal facilities to gauge performance, coordinates with the City’s Facilities Maintenance and Facilities Development teams on building operations and improvement projects, works with staff to develop strategies that expand the renewable energy footprint of buildings, and engages with staff, faculty, and students to help lessen their impact on energy and water usage.

The EWMP plays a critical role in facilitating the strategies noted in *Chapter 6 – Strategies and Actions: Municipal Emissions* of the [Charlottesville Climate Action Plan \(LINK\)](#) that focus on reducing municipal greenhouse gas emissions.

These strategies include:

- Reduce energy demand in existing buildings
- Reduce energy demand in new construction
- Achieve carbon neutrality for all electricity that is used by City facilities by 2030
- Incorporate internal process adjustments to improve coordination effectiveness and collaboration on capital projects and planning

Building on comprehensive performance baseline data and subsequent reports (links provided in Appendix 1), the Energy and Water Management Policy passed in 2019, and the Resolution for Charlottesville City Schools Energy and Water Performance passed in 2019, this report highlights the energy and water performance of over 70 municipal sites in the 2024 fiscal year (July 2023 – June 2024). The City’s performance was reviewed on an account, building, and building group level, where building groups are categories of similar use types of the municipal facilities such as schools, fire stations, and offices. A list of all the facilities and building groups included in this report is provided in Appendix 2.



Performance

Environmental Impacts

In order to align and gauge progress towards the City's greenhouse gas reduction goals, the City established energy and water reduction goals. The City's utility usage performance targets are represented as Energy Use Intensity (EUI) and Water Use Intensity (WUI). These metrics are a standard for comparing building performance as they normalize against facility square footage, thereby allowing different size facilities to be compared with others of the same building type and allows the portfolio to be compared to itself overtime, no matter the fluctuation in total square footage. EUI is a well-established metric with abundant data to compare building types within our region and across the nation. WUI is a less well-established metric with fewer building types and smaller data sets to compare to. *Note: WUI does not include any water usage that is associated to irrigation or outside water usage.*

- **Energy Reduction Goal** - 30% reduction in Energy Use Intensity by FY2030
- **Water Reduction Goal** - 30% reduction in Water Use Intensity by FY2030

More detailed electricity, natural gas, and water usage and cost data across the entire municipal facility portfolio including on building group and building level for the FY2024 year can be accessed at the [City's FY24 Dashboard \(LINK\)](#) (Appendix 3).

On average, most of the City of Charlottesville building groups had a lower EUI in FY2024 compared to the regional average for their representative building groups and there were declines in EUI across all building groups in FY2024 compared to FY2023. As of FY2024, the portfolio as a whole has achieved a 12.7% reduction in EUI from the FY2011 baseline and a 4.3% decline from FY2023 reaching 60.3 kBtu/sq.ft, which was beyond the annual target set at 3.75%. (Table 1, Figure 1). In order to continue on this trajectory and meet our 2030 target, there needs to be a 3.2% reduction in EUI in FY2025 compared to FY2024 (58.4 kBtu/sq.ft). Another measure of performance is the ENERGY STAR score. The City has 37 facilities benchmarked using ENERGY STAR Portfolio Manager, an online tool that allows buildings to receive a score (1-100) based on the level of energy efficiency compared to similar facilities across the nation. Current ENERGY STAR scores can be viewed on the [City's FY24 Dashboard \(LINK\)](#) (Appendix 3).

Overall, there is also a reduction in WUI from the FY2011 baseline year. When comparing FY2024 to FY2011, we see a 14.7% reduction in WUI currently putting the FY2024 WUI at 15.7. This puts the City halfway towards meeting its 30% reduction goal of 12.85 by 2030 (Figure 2). However, when compared to last fiscal year (FY2023), there was a 14.7% increase in WUI and the City's highest WUI since FY2019. This increase in WUI is heavily influenced by an increase WUI in the Office, Courthouse, and Recreation & Sports building groups, whereas there was a significant improvement in the fire station building group WUI (Table 1).

What is EUI and WUI?

The EUI is a measure of how much energy (e.g., electricity and natural gas) a building uses per square foot - the lower the EUI, the better. WUI measures how much water (in gallons) a building uses per square foot – the lower the WUI, the better. These metrics are seen as a standard for comparing building performance as they normalize against facility square footage, thereby allowing different size facilities to be compared with others of the same building type and would allow the portfolio to be compared to itself overtime, no matter the fluctuation in total square footage.

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Table 1: The City’s 11 building groups and portfolio performance metrics (Weather-normalized Energy Use Intensity (EUI) and Water Use Intensity (WUI), and use percent change) with regional or national comparison values. Specific buildings under each building group listed in Appendix 2. [Source for Regional Average EUI](#) and Source for [National Average WUI](#).

Building Group	Gross Floor Area (sq. ft.)	Energy Use Intensity (kBtu/sq.ft.)	Regional Average EUI	Water Use Intensity (gal/sq.ft.)	National Median WUI	FY2024 Energy Use Change (Compared to FY2023)	FY2024 Water Use Change (Compared to FY2023)
Courthouses	48,031	61.7	101.2	7.09	14.48	-6%	63%
Fire Stations	60,616	56.4	63.5	8.59	28.9	-3%	-59%
Libraries	55,158	58.3	71.6	7.37	14.48	-1%	22%
Offices	208,101	50.1	52.9	9.72	14.48	-8%	19%
Parks	--	--	--	--	--		31%
Recreation & Sports	97,764	141.0	50.8	49.18	--	-5%	31%
Schools	806,952	53.6	48.5	10.43	10.84	-3%	1%
Street Lights & Traffic Signals	--	--	--	--	--		--
Transit & Parking*	229,510	24.5	56.2	4.61	3.43	-13%	14%
Vehicle Charging Stations	--	--	--	--	--	--	--
Warehouses & Fleet Mixed Use	84,658	--	--	4.06	3.43	--	-11%
Offices**	39,090	43.1	52.9	--	--	-7%	--
Vehicle Repair***	45,568	50.7	47.9	--	--	-9%	--

* Includes bus terminals and parking garages. Regional Average EUI is for bus terminals.

**Includes Facilities Maintenance building, Pupil Transportation building, and CAT Transit Operations Center (EUI is weighted average).

***Includes City Yard Warehouse and City Yard Wash Facility (EUI is weighted average).

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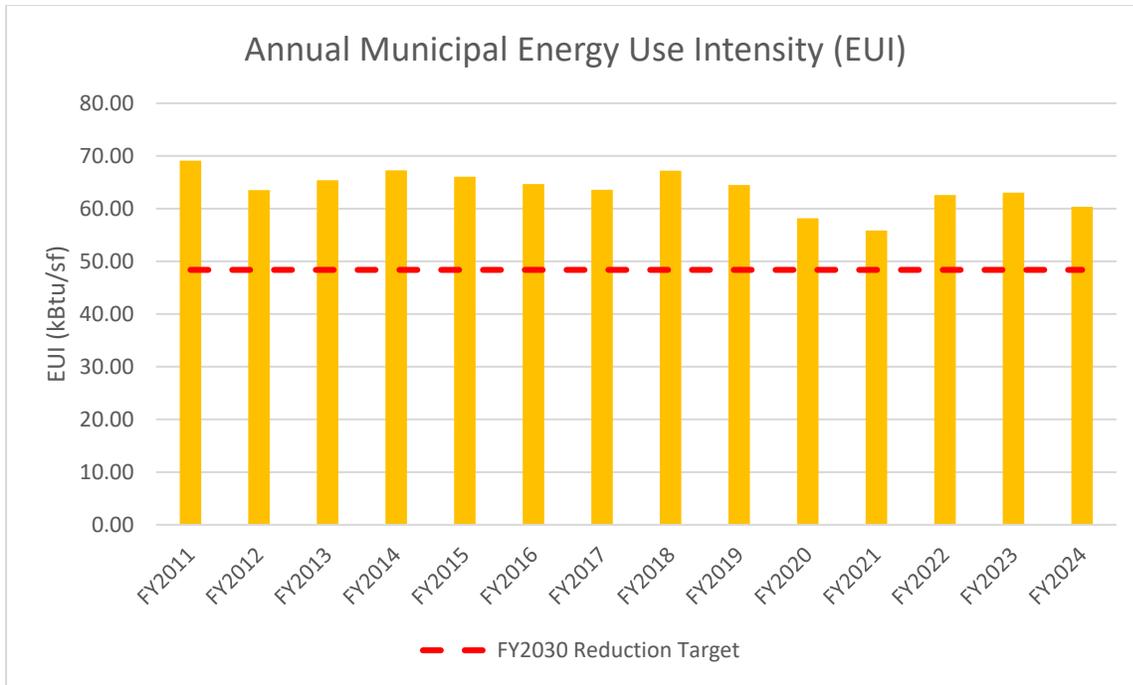


Figure 1: Annual municipal weather-normalized energy use intensity (EUI) for all City facilities (includes streetlights/traffic signals and vehicle charging stations). Red dashed line notes the FY2030 target of 30% reduction from the baseline year, FY2011.

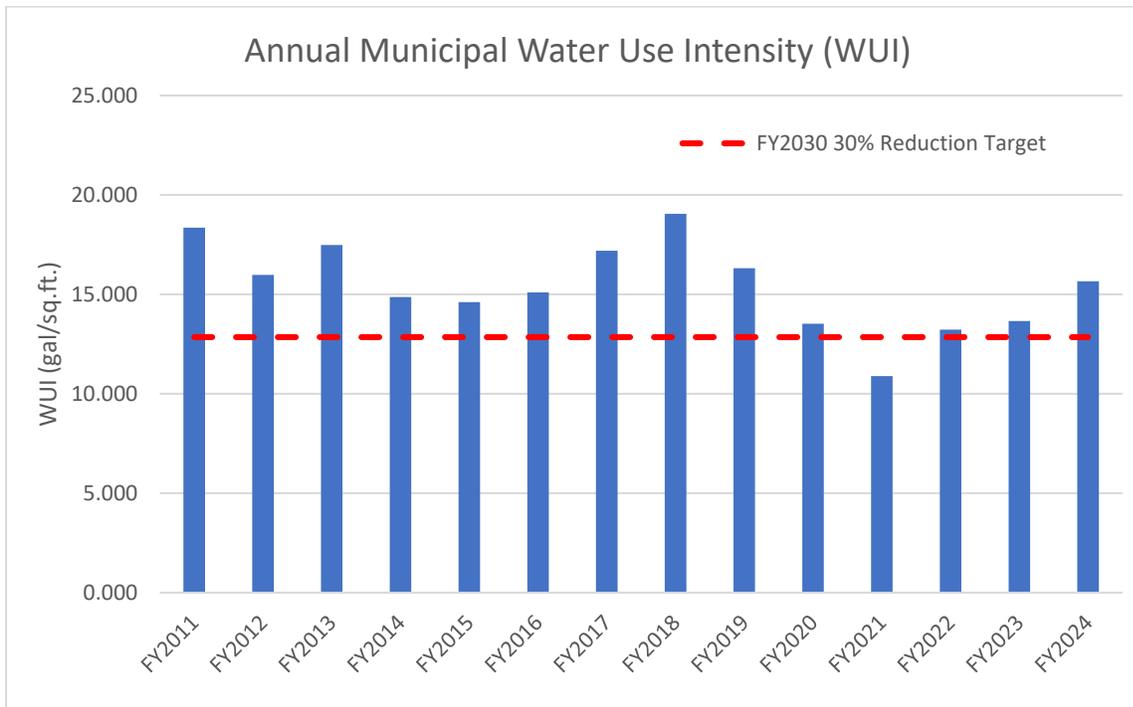


Figure 2: Annual municipal water use intensity (WUI) for all City buildings. Red dashed line notes the FY2030 target of 30% reduction from the baseline year, FY2011. **Note:** irrigation focused accounts were omitted.

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Financial Impacts

Overall, the City (government and schools) spent \$3,661,758 million on energy and water utilities in FY2024. In FY2024, 40% (\$1,448,930) of the total spend was associated with CCS utility accounts. There was a 6% increase in municipal utility spending from last year across all commodities with the largest increase coming from water and sewer at 19% and from electricity at 6%. During this same period, there was a 14% decline in spending for natural gas (Figure 3). This increase in utility costs is associated with increasing utility rates (*electricity - 50% increase, natural gas - 24% decrease, water - 107% increase since 2011*), and increased water usage. In FY2024, the increase in water usage was primarily driven by a few large water leaks including at Juvenile & Domestic Relations Courthouse, Summit Elementary, and a few outside parks related accounts.



Charlottesville High School received numerous energy and water upgrades in FY2024. These included LED installations in the large gym, a portion of the Media Center, and throughout breezeways. Plans for lighting upgrades covering the rest of the school are in development. Phase 1 of the roof replacement was completed in summer 2023 and Phase 2 started in summer 2024. Additionally, a set of restrooms were reconfigured to a single unisex configuration with water efficient fixtures.

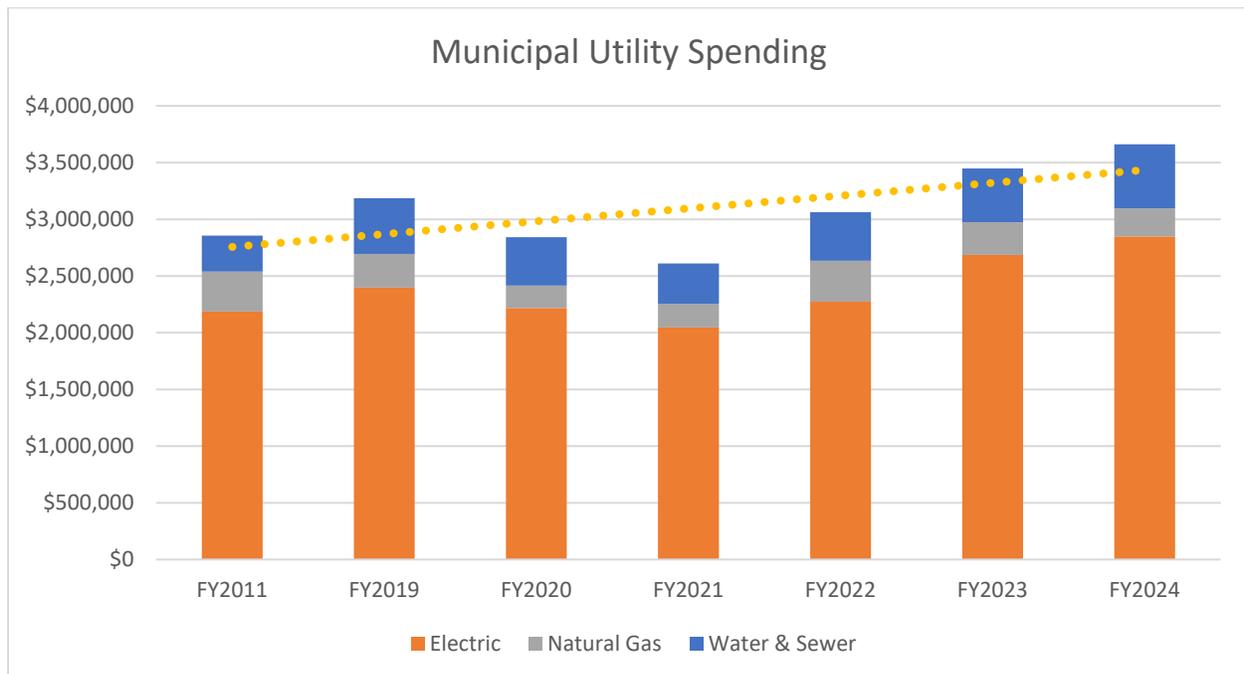


Figure 3: The City’s utility spending for the past 6 fiscal years and FY2011 (baseline year) for each commodity type across all City facilities. The yellow dotted line is the overall trend in spending over time across all years.

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The City started and completed a number of projects intentionally designed to deliver energy and water efficiency improvements. A list of projects projected to improve the City's energy and water usage is provided in Appendix 4.

Since 2011, the municipal portfolio has seen some fluctuation but mostly a downward trend in **achieving a 37% reduction in greenhouse gas emissions by FY2024** (Figure 4). To reach the City's goal of 45% reduction by 2030, the portfolio needs to achieve approximately 1.5% reduction in greenhouse gas emissions per year. The reduction achieved to date is in part due to the electric grid generating energy from cleaner sources, so in addition to the portfolio electricity usage being lower than FY2011, the electricity that is used is producing fewer emissions providing greater greenhouse gas reductions.

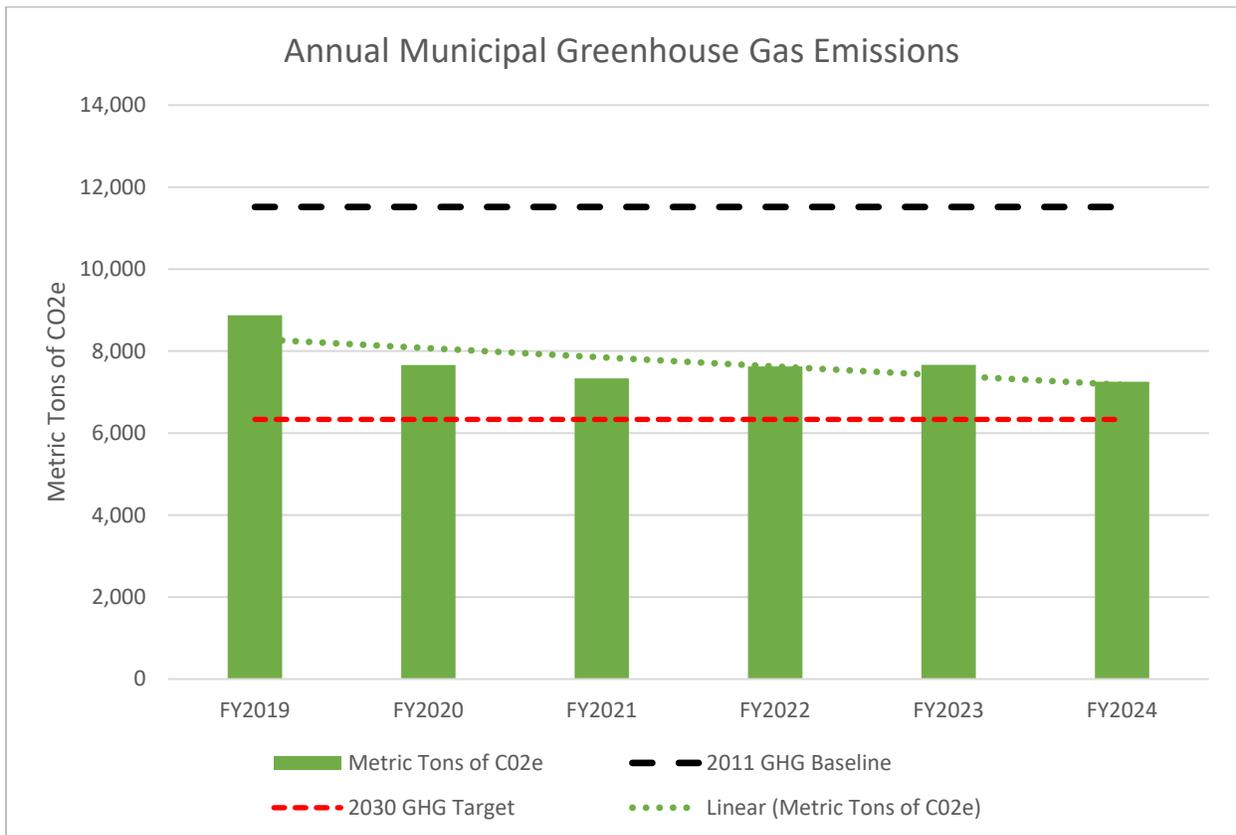


Figure 4: Greenhouse gas emissions for the past 6 fiscal years, FY2011 baseline year, and 2030 GHG Target across all City and school facilities.

The City's municipal energy and water footprint are generally trending in the right direction to enable the City to meet its 2030 greenhouse gas reduction goals. In addition to the existing portfolio, new facilities built to achieve LEED certification based on high performance standards (the new Bypass Fire Station and Charlottesville Middle School) were in the construction phase in FY2024 and will contribute to a lower greenhouse gas footprint once put into operation.

Behavior: Education & Outreach

The EWMP engages municipal building occupants of all ages to empower them to contribute to the efficient performance of the facility. Numerous outlets and media are utilized to educate and communicate with building occupants.

Highlighted FY2024 Education and Outreach Efforts:

Energy and Water Education in CCS Science Pacing Guide

The EWMP has developed energy and water education tailored for CCS curriculum and has incorporated lesson plans into the CCS Science Pacing Guide. These materials are available to all science teachers with the resources necessary to deliver the activities. Additional activities will be added to cover additional climate-related topics. All activities align with grade relevant Standards of Learning (SOLs) and state science curriculum.

Water Conservation Messages in Mirror Clings at CCS

The EWMP distributed mirror clings with water saving messages to all schools. These are displayed in all restrooms (Images 1 - 3).



Images 1 - 3: Mirror clings remind students and staff to save water.

Climate Action Kits at Walker Upper Elementary School

In May 2024, 320 5th graders at Walker Upper Elementary School received Climate Action Activity Kits created by the Community Climate Collaborative (C3) and the Virginia Discovery Museum in partnership with the EWMP. The kits were designed to help students gain a greater understanding of home water and energy use and climate emissions, while connecting families to local energy and water-efficiency solutions.



Images 4 & 5: Students from Walker Upper Elementary checking out the contents of the Climate Action Kits.

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Classroom and School Visits

EWMP visited CCS on several instances to engage CCS students and teachers around energy and water saving practices. EWMP staff tabled during a career fair at Charlottesville High School to talk about their careers in sustainability and encourage students to apply to their summer Energy and Water Management Community Youth Attention Internship Program. The EWMP once again joined Greenbrier's 4th grade class to hear the Global Guardians Conservation Showcase about their energy and water saving actions. These students had some very insightful questions on the [EWMP Performance Dashboard \(LINK\)](#).



Image 6: EWMP staff at Charlottesville High School career fair.

Image 7: Greenbrier Elementary 4th grade class sharing about their final projects at their Global Guardians Conservation Showcase and their advertisements to convince fellow Greenbrier Reading Stars to conserve energy and water.

Climate Action Workplan Alignment

The EWMP continues to work towards meeting their energy and water reduction goals to help the City make progress to meeting their larger greenhouse gas emissions reduction goals and Climate Action Plan commitments (Table 2).

The [City’s Climate Action Plan \(LINK\)](#) presents strategies and key actions to reduce municipal greenhouse gas emissions by switching to lower emissions fuel sources and by reducing energy use through efficiency and conservation measures. Solar power generation has been identified as the primary renewable energy technology to be deployed, and multiple avenues for adding more capacity are being explored. These include internal funding and power purchase agreements (PPAs) to install solar energy systems onsite at facilities as well as consideration of accessing offsite solar through virtual power purchase agreements (VPPAs).

Table 2: Energy and Water Management Program alignment with the City’s Climate Action Workplan. Current reporting is referencing the published FY2025 Climate Action Workplan (<https://www.charlottesville.gov/1667/Climate-Action-Work-Plan>).

Program Name	Timing	Notes
C-SITE Grant Application	Submitted May 2024	Energy-saving retrofit project & solar PV & workforce development at CATEC. This grant was not awarded.
Power Purchase Agreement (PPA)	FY2025	Procurement method to access renewable power on City/School buildings. City is actively reviewing PPA options.
City & School Solar PV Program	Ongoing	Annual program activity Current projects: Bypass Fire Station and CATEC
LED Streetlight Conversion Project	In Progress	Conversion of all Dominion-owned streetlights to LED; project to take 2 – 3 years. Pilot completed in Fall 2024.
Green Building Standards for New Construction and Major Renovations	In Progress	Purpose is to establish internal high performance building standards for all municipal projects.
Municipal Energy Performance Program	In Progress	First project under Energy Master Agreement completed (IT HVAC Replacement). Subsequent projects in development.
Municipal Building Electrification Study	FY2025	Initial screening of electrification feasibility for City/School facilities. Study in development.
Sustainability in the Workplace Program	FY2025	Deploy employee engagement program to encourage sustainability at work and preferences the City’s Energy and Water Management Policy. This is a rebrand and expanded scope of the EWMP’s WE@Work program described in previous annual reports.

Appendices

City of Charlottesville FY2024 Annual Energy and Water Performance Report

Appendix 1: Previous Annual Energy and Water Performance Reports

City of Charlottesville Reports

FY2023 Energy and Water Performance Report

- [City of Charlottesville Fiscal Year 2023 Energy and Water Performance Executive Summary \(PDF\)](#)
- [City of Charlottesville Fiscal Year 2023 Energy and Water Performance Report \(PDF\)](#)
- [EnergyCAP City of Charlottesville Fiscal Year 2023 Energy and Water Performance Dashboard \(LINK\)](#)

FY2022 Energy and Water Performance Report

- [City of Charlottesville Fiscal Year 2022 Energy and Water Performance Executive Summary \(PDF\)](#)
- [City of Charlottesville Fiscal Year 2022 Energy and Water Performance Report \(PDF\)](#)
- [EnergyCAP City of Charlottesville Fiscal Year 2022 Energy and Water Performance Dashboard \(LINK\)](#)

FY2021 Energy and Water Performance Report

- [City of Charlottesville Fiscal Year 2021 Energy and Water Performance Executive Summary \(PDF\)](#)
- [City of Charlottesville Fiscal Year 2021 Energy and Water Performance Report \(PDF\)](#)
- [EnergyCAP City of Charlottesville Fiscal Year 2021 Energy and Water Performance Dashboard \(LINK\)](#)

FY2020 Energy and Water Performance Report

- [City of Charlottesville Fiscal Year 2020 Energy and Water Performance Executive Summary \(PDF\)](#)
- [City of Charlottesville Fiscal Year 2020 Energy and Water Performance Report \(PDF\)](#)
- [EnergyCAP City of Charlottesville Fiscal Year 2020 Energy and Water Performance Dashboard \(LINK\)](#)

Charlottesville City School Reports

FY2023

- [FY2022 Charlottesville City Schools Energy and Water Performance Executive Summary \(PDF\)](#)

FY2022

- [FY2022 Charlottesville City Schools Energy and Water Performance Executive Summary \(PDF\)](#)

2020 Charlottesville City Schools Energy and Water Performance Report

- [Charlottesville City Schools Annual Water and Energy 2020 Performance Report and Executive Summary \(PDF\)](#)

City of Charlottesville FY2024 Annual Energy and Water Performance Report

- [EnergyCAP Charlottesville City Schools Fiscal Year 2020 Energy and Water Performance Dashboard \(LINK\)](#)

2019 Charlottesville City Schools Energy and Water Performance Report

- [Charlottesville City Schools Annual Water and Energy 2019 Performance Report and Executive Summary \(PDF\)](#)
- [EnergyCAP Charlottesville City Schools Fiscal Year 2019 Energy and Water Performance Dashboard \(LINK\)](#)

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Appendix 2: Building groups and specific buildings referenced in the report.

Courthouses

- Circuit Court
- Juvenile & Domestic Relations Court

Fire Stations

- Bypass Firehouse
- Central Fire House
- Fontaine Fire Station

Libraries

- Central Library
- Gordan Avenue Library

Offices

- CAFF Office (414 4th St.)
- City Hall Annex
- City Hall Complex
- Community Attention Main Office (909 E Market St.)
- DHS Administration (907 E. Jefferson St.)
- Preston-Morris Building
- Promise House (708 Page St.)
- Public Works Administration
- Wheeler Building

Parks

- Azalea Park
- Belmont Park
- City Market
- Court Square Park
- Downtown Mall Fountains

- Fifeville Park
- Forest Hill Park
- Greenleaf Park
- Jordan Park
- Maplewood Cemetery
- Market St. Park
- McGuffey Park
- McIntire Park
- Melbourne Road
- Northeast Park
- Oakwood Cemetery
- Pen Park
- PVCC Field
- Quarry Rd. Baseball Field
- Rives Park
- Tonsler Park
- Various Landscape Accounts
- Washington Park Center, Grounds, and Pool

Recreation & Sports

- Carver Rec Center
- Crow Pool/Center
- Key Recreation Center
- McIntire Golf Course
- Meadowcreek Clubhouse and Golf Course
- Onesty Pool
- Smith Aquatic Center

Schools

- Buford Middle School
- Burnley-Moran Elementary
- Charlottesville High School
- Summit Elementary (*formerly Clark*)
- Greenbrier Elementary
- Jackson-Via Elementary
- Johnson Elementary
- Lugo-McGinness Academy
- Trailblazer Elementary (*formerly Venable*)
- Trailblazer Elementary Annex (*formerly Venable*)
- Walker Upper Elementary

Street Lights & Traffic Signals

- Multiple Locations

Transit & Parking

- Downtown Transit Station
- Market St. Parking Garage

Vehicle Charging

- Police Vehicle Station
- Public Works Station

Warehouse & Fleet Mixed Use

- City Yard Warehouse
- City Yard Wash Facility
- Facilities Maintenance
- Public Transportation
- Transit Operation Center

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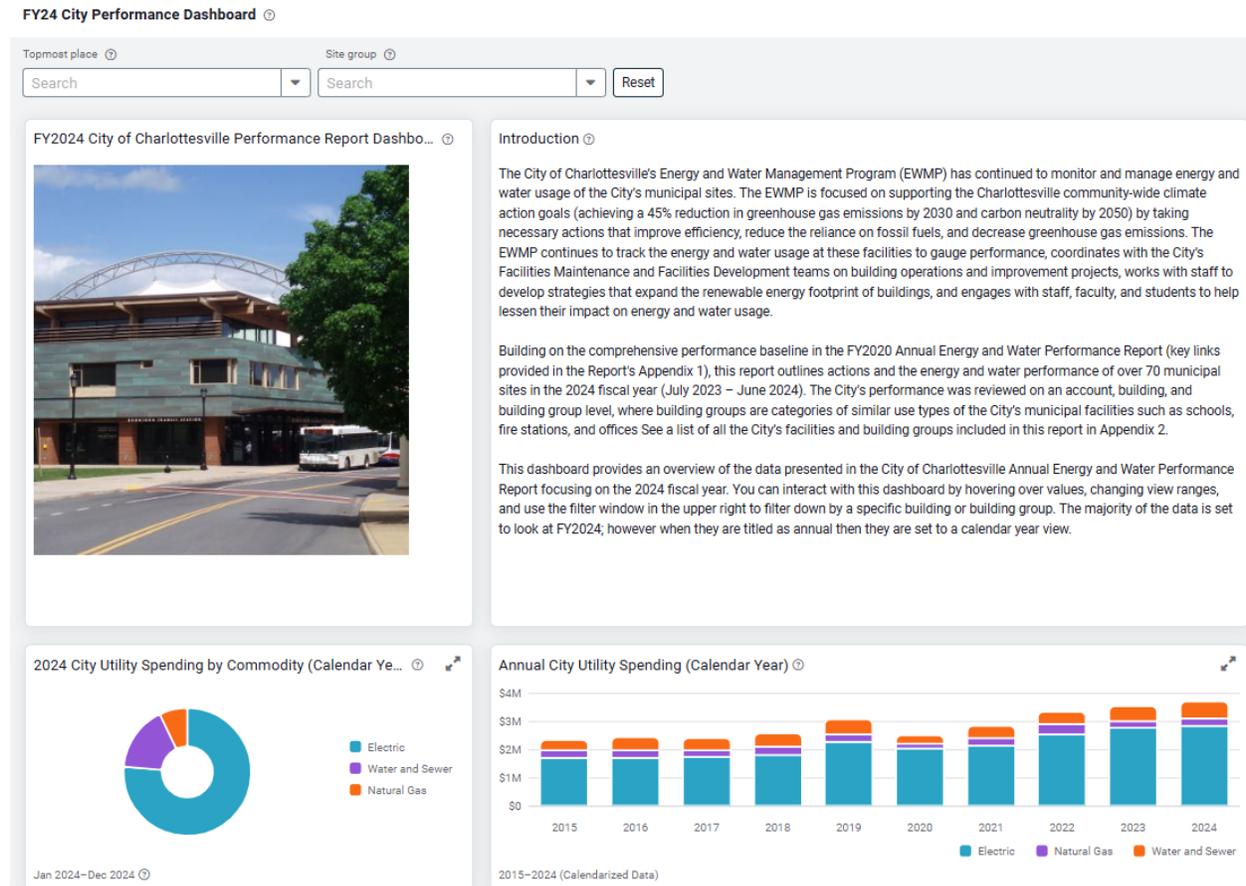
Appendix 3: EnergyCAP Dashboard Info & Link

[EnergyCAP FY2024 City Performance Report Dashboard Link](#)

(Try opening dashboard using Chrome web browser for best results)

This dashboard is an interactive option for viewing the data put forth in this report using the EWMP utility tracking software, EnergyCAP. The figures in this dashboard are all slight variations of the data provided in this report. The data in this dashboard are for all City facilities; however, you can further filter the data specifically for one facility using the “Filter by building or building group” feature in the upper right. Start typing the name of the facility or building group (from Appendix 2) and select the correct name from the auto-generated list and the data will update with your new filtered view. Many of the figures and graphs offer the ability to interact including hovering over the figures to get detailed information and changing time views of the data using the slide bar above or below a graph. Most data presented in these figures are static and are focused on FY2024; however, a few are continually updated with data over time but still include FY2024 numbers and some are showing calendar year views, not fiscal year.

Any questions about this data or dashboard can be directed to EnergyWaterTeam@charlottesville.gov.



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Appendix 4: Energy and Water FY2024 Project List

Note: This is a list of projects designed to deliver specific energy and water performance improvements. It is not an exhaustive list of school and City facility capital projects in FY2024.

Charlottesville City School Facilities

- Venable - Unit ventilators replaced
- Greenbrier – Water source heat pumps replaced
- CHS - LEDs installed in place of fluorescents in the large gym, media center, and breezeways.
- Walker - Replaced inefficient wallpack lighting with LED wallpacks.
- CHS Roof- Phase 1 completed during FY24, Phase 2 started in FY24
- CHS Bathrooms reconfiguration with water efficiency fixtures
- *Numerous Schools – received new HVAC console units

City of Charlottesville Facilities

- J&DR – Water source heat pump replacement
- Circuit Court – Replaced ceiling lights in clerk area with LEDs

Other

- Streetlights – initiated conversion to LEDs