CITY OF CHARLOTTE

# Advancing the Strategic Energy Action Plan

**APRIL 24, 2023**

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## Purpose

**Provide an Update on City Council's Strategic Energy Action Plan**

- Towards 2030 (Municipal fleet and buildings)
- Towards 2050 (Community-facing)

**Highlight Opportunities and Challenges Ahead**

**Receive Feedback**



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# Background

SEAP
STRATEGIC ENERGY ACTION PLAN
CITY of CHARLOTTE



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SEAP
STRATEGIC ENERGY ACTION PLAN
CITY of CHARLOTTE

**GOALS**

- Strive to source 100% of municipal energy use in buildings and fleet from zero carbon sources by **2030**
- Strive to become a low carbon city by **2050**, emitting less than 2 tons of carbon dioxide equivalent per person

**FOCUS AREAS**

1. Buildings
2. Transportation
3. Energy Generation
4. Workforce Development



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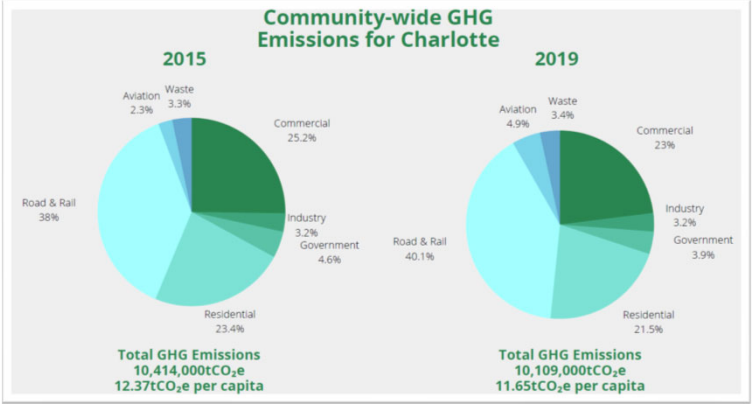
# Greenhouse Gas Emissions – The Why




**Down 5.8% per capita:**

- **Energy Mix**
- **Population Increase**

**Buildings and Transportation are biggest emitting sectors, locally**



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# Toward 2030: Fleet




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# Leading the Charge…

- City has a total of **ten different electric models** in the fleet
- 2022 Brought Deliveries of First All–Electric Ford Mustang Mach-E, Ford F-150 Lightning, and Aebi Schmidt eSwingo 200 Bike Lane Street Sweeper
- Local student won decal design competition
- Ordered the first all-electric Fire Truck
- Won a Volkswagen Settlement Grant for a Class 8, Heavy Duty truck
- Continued deployment of automatic vehicle locators



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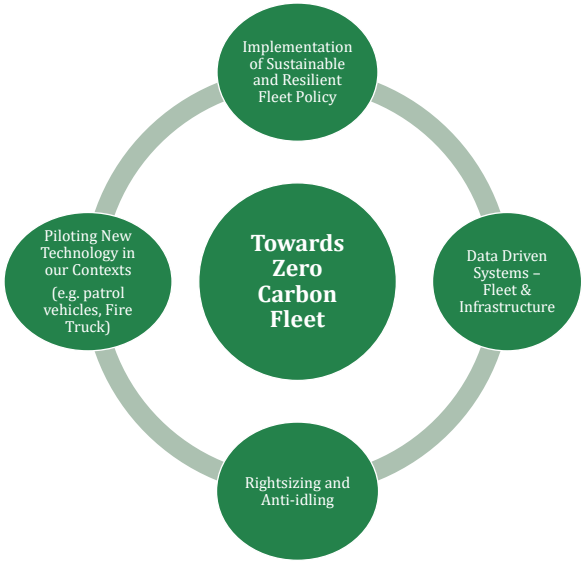
# Approach

**Strategic Energy Action Plan (2018)**

- **Staggered introduction** of zero carbon over the next 12 years
- City goal to achieve a zero carbon fleet by 2030 is **aspirational** and **ambitious**
- Technology advancements, operational compatibility and risk management, and the availability of appropriate resources and funding will continue to innovate offering new opportunities.

**Sustainable and Resilient Fleet Policy (2020)**

- Vehicle purchases will be assigned to a tiered system based on the degree of emissions reduction
- Fleet Management will identify the highest tier in which a suitable replacement vehicle is available



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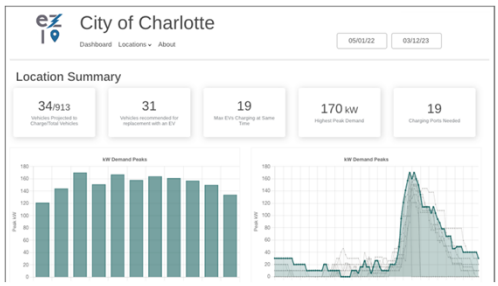
## Using Data

Continued deployment of Automatic Vehicle Locators (AVLs) provides data that supports the identification of:

- Vehicles for electrification
- Best locations for electric vehicle charging infrastructure
- Underutilized vehicles
  - ✓ Vehicles for decommissioning (24)
  - ✓ Vehicles that will be cascaded to other departments or used for a satellite motor pool (20)
- Strategies to avoid energy demand charges

Sawatch analytics uses minute-by-minute operational data to project vehicle charging load and aggregates that data to show how EV charging will impact peak demand at each facility




SAWATCH



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## By the Numbers

**CO2 Avoided**: 1,727 metric tons

***1 metric ton of Carbon Dioxide***
***=***
***2,564* miles driven by an average gasoline-powered passenger vehicle**

10% of all City sedans are electric

17% of non-patrol sedans are electric

**Fleet and Charging Metrics**

2% EVs

6% bus fleet BEBs

9% Alternative Fuel

138 EV charging stations

236 ports

50 EV charging stations available to public

93 ports

2,153 unique drivers charged

**SEAP Implementation (Snapshot)**

11 EVs → 90Evs

46 EV charging stations→ 138 EV charging stations



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## Challenges and Opportunities

- Supply Chain
- Technology
- Grid mix
- Market availability
- Operational Compatability
- Take Home Vehicles
- Offsets

## A Snapshot of Cities' Electrification Goals

| City | Year | Fleet Electrification Goals |
|---|---|---|
| Minneapolis | 2030 | Reduce GHG emissions from City's fleet by 1.5% annually |
| Houston | 2030 | 100% conversion of non-emergency, light-duty municipal fleet |
| Philadelphia | 2030 | 100% procurement of EVs for sedans, SUVs, vans, and light-duty pickup trucks by 2030, reduce light- and medium-duty vehicle emissions by at least 45% from 2019 levels |
| Boston | 2035, 2050 | 100% of passenger vehicles (light duty) are ZEVs by 2035; 100% of medium-duty vehicles are ZEVs by 2050 |
| New York City | 2040 | On-road vehicles in fleet converted to all-electric or plug in electric |
| Greensboro | 2040 | City fleet composed of zero carbon sources |
| San Antonio | - | Convert all fleet passenger vehicles and small trucks to more efficient options by 2025 with a priority on electrification |
| Atlanta | - | Expand electric municipal fleet |

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## Toward 2030: Buildings + Energy Generation

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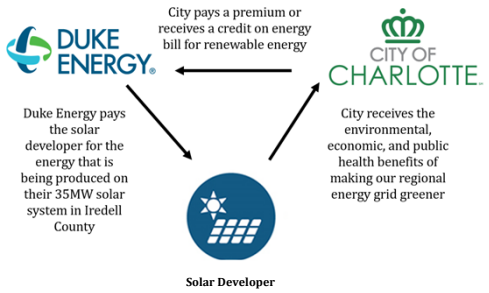
## DUKE ENERGY GREENSOURCE ADVANTAGE PROGRAM

- Reaffirmed commitment with additional investment to program to support the development of renewable resources (35 MW solar farm) and lower carbon emissions
- Expected completion date slated for 2024




*Offsets approx. 21.5% of projected buildings energy usage by 2030*

*Project modeled to avoid *$20 million in expected regional healthcare expenses*

*Derived from the AP2 (local) and DICE (climate) models; William Nordhaus helped develop both. His work on the DICE model was awarded the 2018 Nobel Prize in Economics



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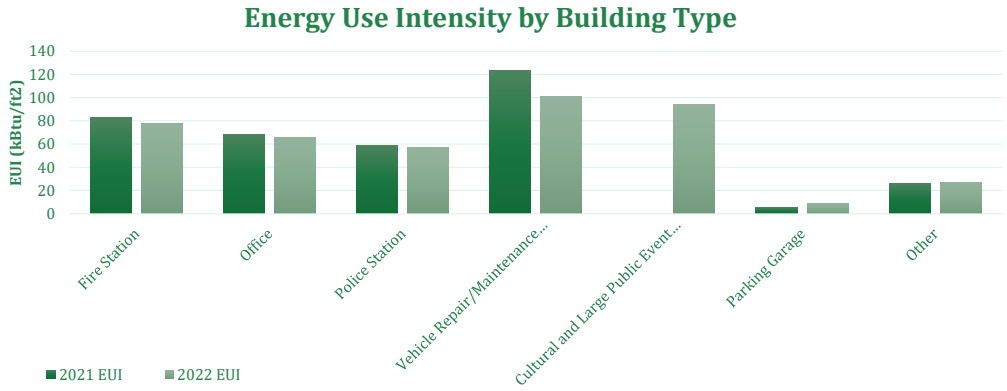
## Towards Energy Efficiency - Municipal Benchmarking




- 59% of buildings benchmarked last year improved their energy performance
- 83% of Fire Stations performed better in 2022 compared to 2021
- Strategic investments in city facilities such as building automation controls and equipment replacements coupled with informed building operations are resulting in buildings operating at higher efficiencies
- As facility uses and needs change over time, they present opportunities for efficiency focused adjustments and improvements to reduce energy usage
- A deeper look at the CMPD facilities will yield projects that lead to increased efficiency



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# Sustainable Investments & Sustainable Facilities Policy


- Design for the first fully electric fire facility, which will house the all-electric fire truck, **includes:**
  - Electric fire engine charging
  - Electric vehicle charging and readiness
  - Geothermal HVAC
  - All-electric hot water and bay heating
  - Rooftop solar PV system.
- CMPD South has a fully operational solar PV system which has produced 47.16 MWh since August 2022. **This offsets approximately 46% of the electricity usage at the station.**
- Charlotte Water Zone 4 field operations center, under construction, will be a LEED-certified facility, and includes solar and electric vehicle charging

Prior to SEAP implementation, the City had 6 solar PV systems, Once all the systems in design or under construction are completed, **the City will have a total of 2,194 kW of solar PV in operation, and 27 total systems.**



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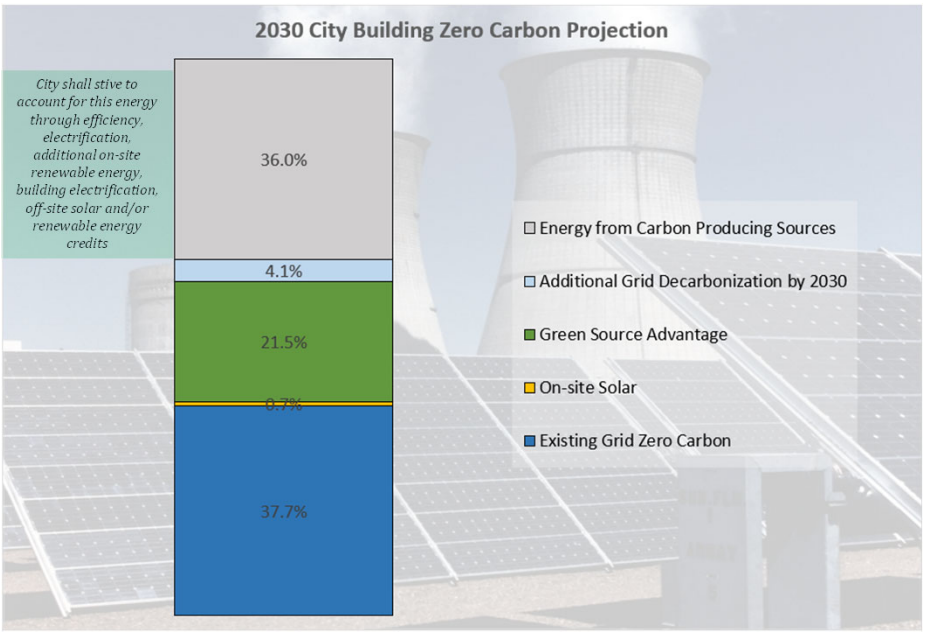


Note: The chart makes the following assumptions:

1. Total energy use will grow by 1% annually from 2022's energy use;
2. The electric and natural gas use mix will be the same as 2022;
3. No additional solar is accounted for beyond what is currently planned and budgeted for; and
4. Future energy efficiency projects are not accounted for.

*The city continues to refine data collection, year over year in partnership with Duke Energy and internal stakeholders and update assumptions as information become available



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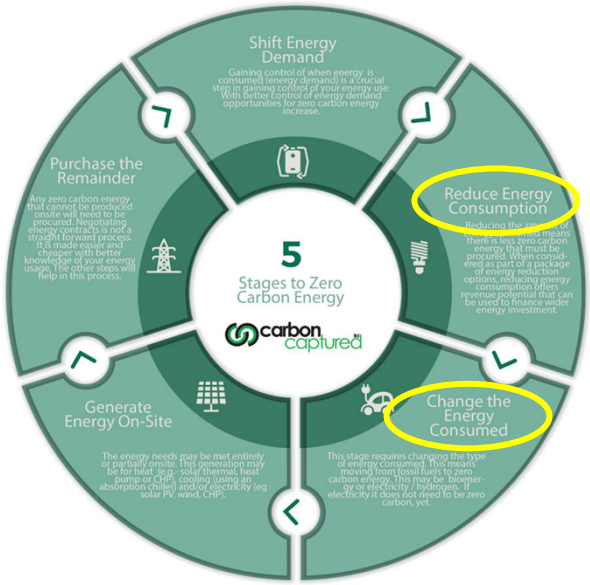
# Towards 2050: Current Programs, Partnerships & Projects



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## Why an Energy Benchmarking Program?

SEAP goal to be a

***LOW CARBON CITY BY 2050***

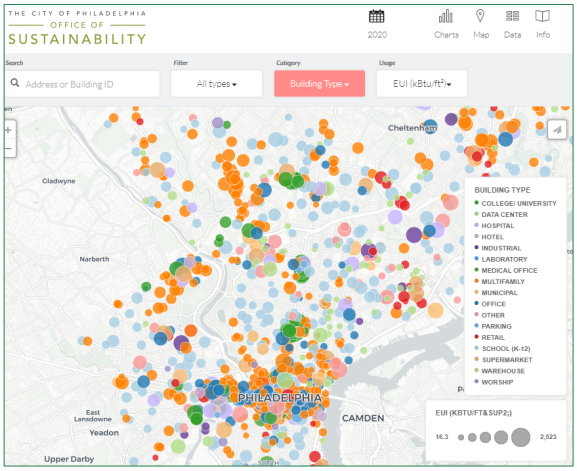
Building sector accounts for about 50% of carbon emissions in Charlotte

Job creation

Transparency

Healthier, more sustainable community

Community benchmarking is a strong practice by peers







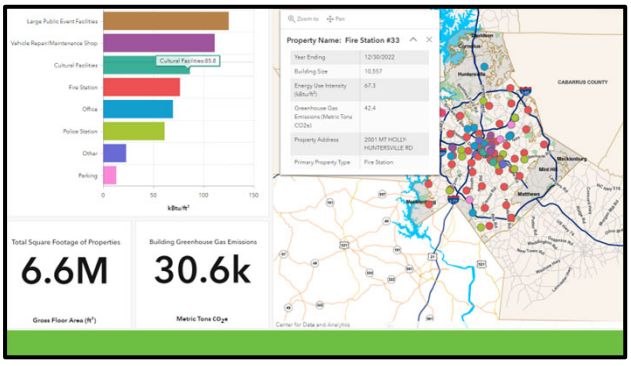

## POWER DOWN THE CROWN

**Program Components**

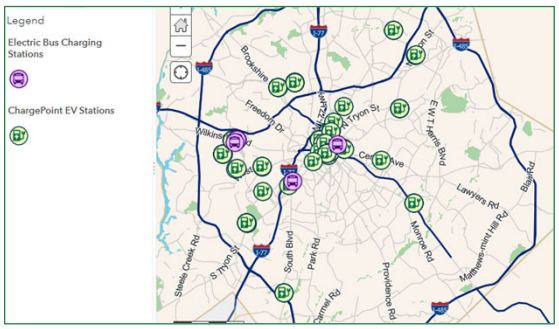
- Publicly share building energy performance through Energy Star Portfolio Manager
- Work towards portfolio wide energy use intensity reduction goal of 10% by 2030
- Provide case study on highlighting successful energy efficiency work

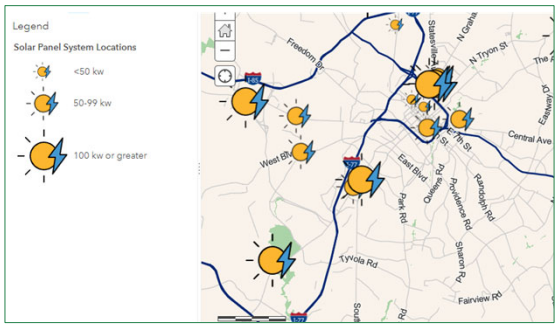
**Program Benefits for Participants**

- Demonstrate your organization as a community leader in the effort to meet the SEAP's goals
- Share and learn energy efficiency best practices and receive technical support for tracking energy data




***Participant Partners Already Include: Central Piedmont Community College, Honeywell, Kimco Realty, Novant Health, Nucor, Trane Technologies, and UNC Charlotte***




# SEAP Data Dashboard

## Coming Soon (Spring 2023)

**Phase I**

- Electric Vehicle (EV) Charging Stations
- Solar Photovoltaic Systems
- GHG Emissions





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## Embedding Equity

**PoleVolt Pilot**: The City of Charlotte, UNC Charlotte, Duke Energy, and Centralina Regional Council partnered to pilot electric vehicle (EV) utility pole-mounted chargers.

- Educational event called EV's for Equity, hosted by CleanAIRE NC, Historic West End Green District

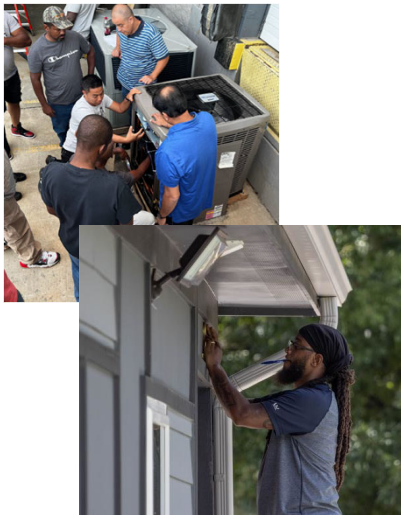
**AMP (Affordable Mobility Platform)**: $10 million project, 50% funded through U.S. Department of Energy's Vehicle Technologies Office, leveraging carshare software and services to increase equitable access to clean transportation options.

- Charlotte the only location on the East Coast
- Program slated to go live, Fall of 2023
- Goal: Develop a business model that will make the program self-funded in the future

## Embedding Equity

**RENEW**: Partnership with the Urban League of Central Carolina and Goodwill provides participants with paid training and hands-on learning in the HVAC and electrical trades focused on energy efficiency and renewable energy.

- To date, 121 training participants have successfully graduated the RENEW training program.
- Council allocated $500k ARPA in 2022.



**Duke Energy – City of Charlotte Energy Efficiency Pilot Program:** The work of this partnership will complete energy efficiency retrofits and needed home rehab at no cost to approximately 500 income-qualified, high energy-use (electricity) households in Charlotte.

- Duke's energy efficiency budget for Charlotte is approximately $4M
- Council allocated $1M in ARPA funding for home rehab to enable energy efficiency work



## Toward 2050: Policy & Investments

UDO UNIFIED DEVELOPMENT ORDINANCE

CHARLOTTE STRATEGIC MOBILITY PLAN

## Unified Development Ordinance and Strategic Mobility Plan

UDO
UNIFIED DEVELOPMENT ORDINANCE

**Key Sustainability Themes**

- Electrical Vehicle (EV) Charging
- Clean Energy fee-in-lieu
- Updated Environmental Bonus
- Updated Tree-focused requirements

CHARLOTTE STRATEGIC MOBILITY PLAN

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## SEAP Strategy: Facilitate Rapid Uptake of Sustainable Modes of Transportation

Example: The city is focused on creating an All Ages and Abilities (AAA) bike network and transforming Charlotte into a world-class bicycle city.

- In 2022, approximately 4 additional miles of bike facilities were constructed, resulting in the following AAA network statistics:
  - 18.5 total AAA miles
  - 6.8 miles of separated bike lanes
  - 11.7 miles of shared-use paths



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# Awards & Recognitions



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# Additional Awards & Recognitions

- In partnership with UNC Charlotte and Duke Energy, the city received the Diversity, Equity and Inclusion in Cleantech award from the Research Triangle Cleantech Cluster for the PoleVolt initiative to develop curbside charging stations in the Corridors of Opportunity. The first station was installed at the Ritz at Washington Heights.
- As a signatory to the Global Covenant of Mayors, the city reports its climate actions and planning through the CDP (formerly called the Carbon Disclosure Project). CDP is a nonprofit that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. In 2022, the city received an A-, the highest grade to date. The score exemplifies the city's efforts in addressing climate change and demonstrates progress.
- In August 2022, Charlotte Douglas International Airport joined the Airport Carbon Accreditation Program at level 1 to independently assess and verify the airport's efforts to manage and reduce their CO2 emissions.

RESEARCH TRIANGLE CLEANTECH CLUSTER™

airport carbon accreditation

CDP DISCLOSURE INSIGHT ACTION



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# Moving Forward

- Charlotte is making progress and continues to lead
- A Communitywide focus on 2050 low carbon city goals is key
- There is an opportunity to take a closer look at strategies and objectives given what we know now and update the SEAP
  - Set/review communitywide targets (greenhouse gas emissions, renewable energy and EVs)
  - Refine fleet targets and milestones
  - Outline offset strategies for municipal and communitywide goals



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THANK YOU FOR YOUR TIME

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