SEAP

STRATEGIC ENERGY ACTION PLAN

CITY of CHARLOTTE

2021

STRATEGIC ENERGY ACTION PLAN: YEAR THREE

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INTRODUCTION

In June 2018, the Sustainable and Resilient Charlotte by 2050 Resolution was unanimously passed by City Council. This resolution set ambitious municipal and communitywide greenhouse gas emissions reduction goals for the City of Charlotte. Specifically, it strives to have city fleet and facilities be fueled by 100% zero-carbon sources by 2030. It also set a communitywide goal for Charlotte to become a low-carbon city by 2050 by reducing greenhouse gas emissions to less than two tons of carbon dioxide equivalent per person, annually. Lastly, it called for a Strategic Energy Action Plan (SEAP) to determine how Charlotte would reach these two goals. The SEAP was developed in partnership with city staff and community stakeholders and was unanimously adopted by City Council in December of 2018.

The Office of Sustainability and Resilience directs and collaborates on citywide actions to achieve City Council's goals to reduce carbon emissions both at the municipal level and communitywide.

2021 was a year of progress towards the goals outlined in the SEAP as well as the following mission:

Charlotte will lead as a global city by continuously improving, protecting, and preserving the environment, its community, and economy, while ensuring equity and resilience - for today's and future generations.

After three years of foundational efforts since the SEAP's creation, the 2021 report demonstrates action, investments, and policy implementation towards a healthy and equitable, low-carbon future.

The above visual was created to depict a low-carbon Charlotte. It highlights community and residential solar, public electric vehicle charging, zero-carbon forms of transportation, and community partnerships.

Launched in 2019, the Bloomberg Philanthropies American Cities Climate Challenge (the Climate Challenge) was created to provide powerful resources and support to 25 of the largest U.S. cities in their fight against climate change. With this support, these 25 cities set out to show how bold, local action can have a major impact on climate change and can improve people's lives. Even during the global COVID-19 pandemic, Climate Challenge cities rose to the occasion and demonstrated that the fight against climate change is also a fight for public health, economic recovery, and social justice. Over two years later, Charlotte, alongside other cities has tested and implemented successful climate policies and programs spanning the transportation, buildings, and energy sectors.

74 MILLION MT OF CO_2 **REDUCED** THROUGH 2030

54 MAJOR BUILDINGS, ENERGY, AND TRANSPORTATION POLICIES PASSED

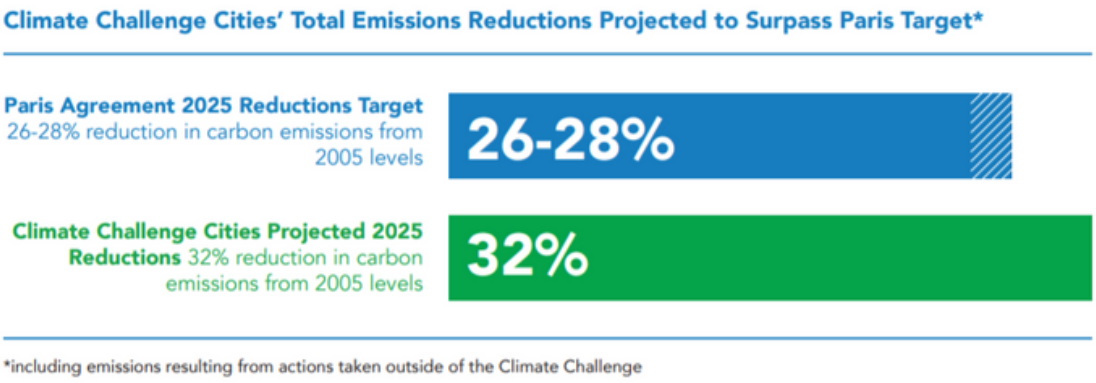
MORE THAN **800 MW** OF RENEWABLE ENERGY UNDER CONTRACT OR PENDING

11,481 NEW ELECTRIC VEHICLE CHARGERS INSTALLED

MORE THAN **800** RESIDENTS TRAINED OR UPSKILLED IN GREEN JOBS

As of October 2021, these 25 diverse cities across the political spectrum have passed 54 major buildings, energy, and transportation policies and launched 71 new climate programs and initiatives. In total, the work of the Climate Challenge across 25 cities will reduce carbon dioxide emissions by 74 million metric tons (MT) from 2020 through 2030, compared to a business-as-usual scenario. Notably, when evaluating the combined work of all cities, including action taken outside of the Climate Challenge, cities are collectively on track to reduce emissions by 32 percent below 2005 levels by 2025, which will beat the 2025 Paris Agreement goal of a 26 to 28 percent reduction.

Read more in the Climate Challenge Report.



BUILDINGS

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL BUILDINGS BY 2030

- In January 2021, City Council adopted the updated Sustainable Facilities Policy to align with the Sustainable and Resilient Charlotte by 2050 Resolution and the SEAP. These revisions emphasize:
  - Reducing energy consumption in municipal buildings,
  - Enabling more rooftop solar on municipal buildings,
  - Establishing more electric vehicle charging at municipal parking lots,
  - Formalizing a building energy performance benchmarking process to measure progress, and
  - Strengthening the ability to make data-driven decision for future investments.

- Integration of this policy into building projects is underway. For example, the design of the Hidden Valley Fire Station is informed by these policy standards. As a result, this project will include rooftop solar, electric vehicle charging stations, and an ultra-efficient heating, ventilation, and air conditioning (HVAC) system.

- The Charlotte-Mecklenburg Police Department (CMPD) South project team earned the 2021 U.S. Green Building Council (USGBC) Carolinas Leadership Award for their exceptional achievements and significance in the green building industry.
  - Earlier this year, USGBC awarded the 17,000 square foot CMPD South Division Station with a Leadership in Energy and Environmental Design (LEED) Silver Certification for its sustainable design.
  - Sustainable design elements include geothermal heating and cooling, and insulated concrete form walls.

- The 34,000 square foot CMPD Central Division Station was certified as a LEED Silver building for its low-carbon design. Design elements include access to transit, bicycle facilities, green vehicle parking, white membrane roof, 85 percent less irrigation use, optimized mechanical system for energy performance, low emitting materials, and interior lighting controls.

- LED Retrofit Project: All lighting in nonexhibit areas of the Mint Museum Randolph was upgraded to LED lighting.
  - This resulted in an annual electricity reduction of 80,492 kWh which is the equivalent of 57 metric tons of carbon dioxide equivalent or more than 10 homes' electricity usage per year.

BUILDINGS CONTINUED

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL BUILDINGS BY 2030

What Is Benchmarking?

Building energy performance benchmarking (benchmarking) is a method to determine whether a building is using more or less energy than comparable buildings with similar use characteristics. This practice also allows organizations to check their own yearly energy reduction progress.

Why Are We Benchmarking?

Benchmarking can offer several benefits for building owners, operators, occupants and surrounding communities. Benchmarking data allows building owners and operators to assess the relative energy performance of their buildings and prioritize investment opportunities to cost-effectively reduce energy consumption. A recent study by the Environmental Protection Agency (EPA) found that buildings benchmarked on a consistent basis achieved an average annual energy savings of 2.4%. In addition, studies have established strong correlations between reduced energy consumption, associated greenhouse gas reductions, and improved public health. Finally, reducing energy usage is a strategy for reaching low-carbon, SEAP goals.

The city's first annual benchmarking report can be found on charlottenc.gov/seap. Included in this report are 93 buildings that meet benchmarking criteria set by the Sustainable Facilities Policy and represent more than 7 million square feet of building space. This benchmarked square footage is a segment of the total municipal building space eligible for benchmarking.*

The city spent $5.5 million in energy to operate buildings within the portfolio benchmarked in this first report during the 12-month performance period. If these buildings achieve the average annual energy savings of 2.4% for buildings that consistently benchmark, the city would save $132,000 in annual energy costs and reduce municipal building carbon emissions by over 1,000 metric tons annually.

*Additional building space will continue to be incorporated in subsequent years as city staff continue to work through energy usage attribution, data discrepancies, and the challenges of benchmarking complex buildings (e.g. airport terminals).

ENERGY GENERATION

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL BUILDINGS AND FLEET BY 2030

- In March, Charlotte City Council approved a contract in the amount of $1,602,640 for solar panel installation on city facilities, as was allocated in the FY 2021 budget for Sustainable Infrastructure.
  - This includes the design, engineering, and installation of solar panels, including both roof-mounted and ground-mounted arrays, which collectively represent approximately 828 kilowatts of total solar capacity.
  - Once constructed, these solar panel installations are expected to generate over one million kilowatt hours of zero-carbon electricity annually, which is equivalent to powering over 100 homes with clean, renewable energy for a year.
  - The installations will be at ten facilities across various departments: Charlotte-Mecklenburg Police Department (CMPD), Charlotte Fire Department (Fire), and Charlotte Department of Transportation (CDOT).
  - With the completion of this work in 2022, it will bring the city's total on-site solar installation count to 20.

Engaging with the North Carolina Utilities Commission for long term and equitable carbon reduction

In February, The City of Charlotte formally participated in the North Carolina Utilities Commission Integrated Resource Plan, which is Duke Energy's proposed plan to generate energy for the next several years. By filing comments that reflect Charlotte's goals around energy efficiency, carbon reduction in energy generation, access to renewable energy, vehicle electrification and racial and economic equity, the city demonstrated its commitment to SEAP goals and the importance of a low-carbon, equitable future for North Carolina.

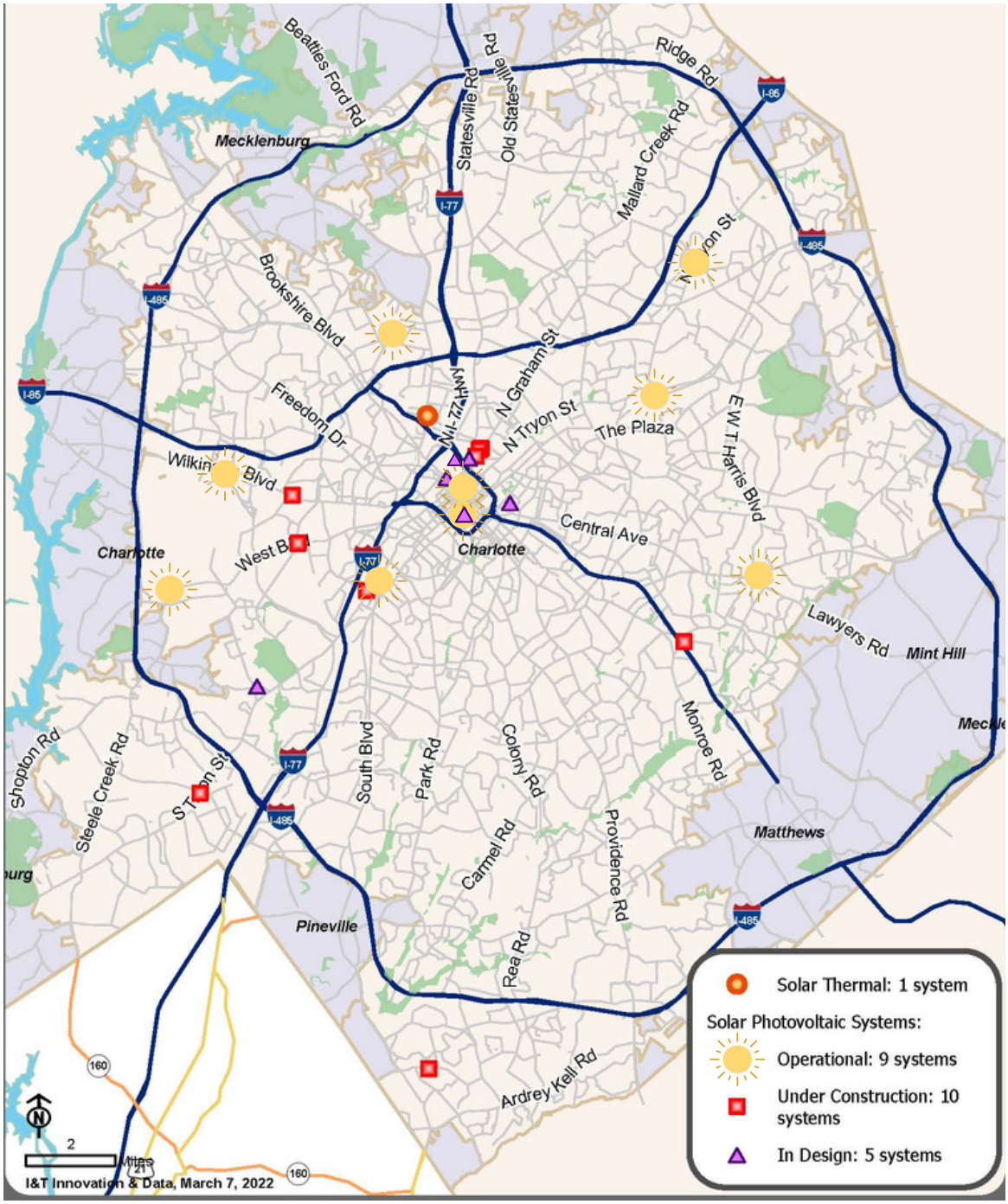
In November, The City of Charlotte again formally participated in a North Carolina Utilities Commission proceeding, the performance-based regulation docket, restating city priorities of equitable carbon reduction.

ENERGY GENERATION: CITY OF CHARLOTTE MUNICIPAL SOLAR ENERGY SYSTEMS

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL BUILDINGS AND FLEET BY 2030

The image below shows the location of existing and planned municipal solar photovoltaic and solar thermal energy systems. Capacities are as follows: 931 kilowatts* and 168 kBtu operational**, approximately 828 kilowatts under construction, and approximately 416 kilowatts in design.

*100 kilowatts is pending approval from Duke Energy to begin operating. **A solar thermal system, which creates heat for a water heater.



WORKFORCE DEVELOPMENT

DEVELOP A GREEN WORKFORCE PIPELINE IN SUPPORT OF A CLEAN ENERGY TRANSITION

- In September 2020, The Renewable Energy and Energy Efficiency Workforce (RENEW) Training Program launched in alignment with CARES Community Relief Strategy, and the Workforce Development pillar of the SEAP.
- RENEW provides paid training through Urban League of Central Carolinas and Goodwill Industries of the Southern Piedmont in the areas of HVAC and Electrical Trades for Charlotte residents negatively affected by COVID-19. This four-month course teaches basic skills for the industry and provides hands-on experience with the sustainable technologies in this field.
- Over the course of 16 months, RENEW graduated 86 participants from the program. 73% of graduates are working full-time.
- This year, RENEW launched an all-female cohort in partnership with Goodwill, training 15 participants.
- The city developed a Corporate Advisory Council (CAC) to support RENEW and provide employment opportunities to graduates, which has grown to over 200 participants. The CAC convenes every six weeks with approximately 45 representatives from the heating, ventilation, and air conditioning (HVAC) and sustainable technologies sector - companies such as Trane Technologies, Horne Heating and Air, Rodgers Builders, DPR Construction, Lincoln Harris, and more.
- RENEW was recently awarded a $55,000 grant from Northwood Office, a privately held, global real estate investment and management firm. They selected this program as the community partner recipient for their annual gift. This funding will go towards 2022 cohorts.

"As our community continues to navigate the effects of the pandemic, RENEW's ability to make a meaningful impact on workforce development in the Charlotte region is more critical now than ever,"
- Hailey Rorie, community director at Northwood Office.

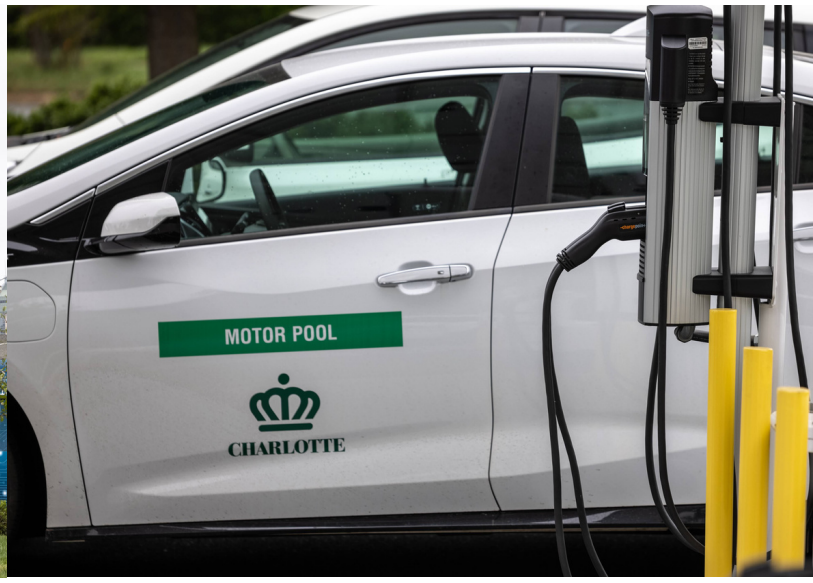
TRANSPORTATION: ELECTRIFICATION

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL FLEET BY 2030 AND FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION

INNOVATIVE ELECTRIC VEHICLE CHARGING

- PoleVolt Pilot: The City of Charlotte, the University of North Carolina at Charlotte, Duke Energy, and Centralina Regional Council partnered to pilot two electric vehicle (EV) utility pole-mounted chargers.
  - This innovative project utilizes existing Duke Energy-owned utility poles and curbside parking to provide community charging to residents.
  - If successful, the project would realize a new avenue for EV charging that would leverage existing assets, using first of its kind technology in North Carolina.
  - Once implemented, this pilot could create practices for Charlotte and other communities that supports equitable access to charging infrastructure.
  - Installation of chargers is expected in 2022.

- EV Arcs (shown bottom left) are solar-powered, EV charging stations that can be moved to different locations to accommodate and encourage the community charging of vehicles.
  - Community members can charge their electric vehicles for free, while utilizing zero carbon energy.
  - The EV Arcs are currently located at Charlotte Fire Headquarters, Charlotte Department of Transportation Northpointe campus, and at Camp North End.



TRANSPORTATION: SUSTAINABLE AND RESILIENT FLEET POLICY REPORTING

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL FLEET BY 2030 AND FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION

The City of Charlotte is implementing the Sustainable and Resilient Fleet Policy focused on purchasing the lowest-emitting vehicle depending on usage and technology. This policy includes reporting at the end of each Fiscal Year. Below are some facts and figures.

- The city currently has a total of 105 total electric vehicle (EV) charging stations with 194 ports; 50 stations are available to the public.
  - On the 50 public stations, there are 93 total ports.

- The city also has 7 battery electric bus (BEB) chargers with 7 ports.

- In 2021, city-owned public EV charging stations charged 2,039 unique drivers' vehicles, meaning 2,039 different vehicles charged at least one time at a city-owned station.

- The Sustainable and Resilient Fleet Policy states that vehicles with an internal combustion engine will be evaluated to include idle reduction technology to reduce fuel consumed.
  - Vehicle idle hours avoided in fiscal year (FY) 2021: 441.8 hours.

- To ensure that vehicle purchases align with the city's carbon reduction goals, proposed vehicle purchases will be assigned to a tiered system based on the degree of emissions reduction. As a result of that system, below are the following fleet demographics from FY 2021:
  - Number of Zero Emission (Electric) Vehicles: 43.
  - Percentage of Overall Fleet: Less than 1%.
  - Number of Alternative Fuel Vehicles: 81.
  - Percentage of Overall Fleet: 3%.
  - Carbon avoided: 2,187 metric tons.

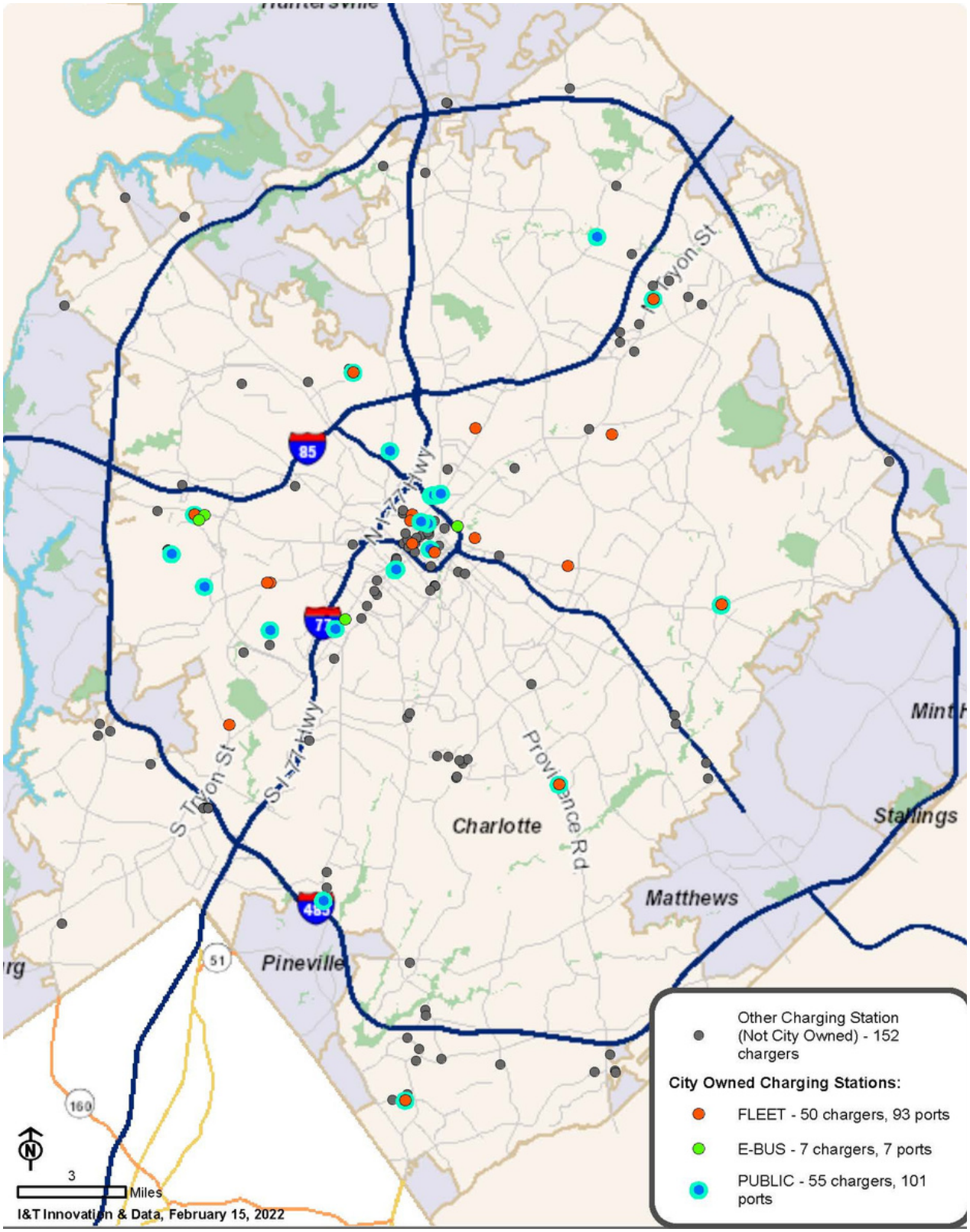
- With FY 2022 investments, including five Aviation BEBs and an 18 BEB pilot at CATS, the city will have a total of 88 EVs.

- In addition to the Aviation BEBs and CATS BEB pilot, the city is prioritizing transitioning sedans and other light duty vehicles: 17% of sedans are electric (excluding police pursuit vehicles); the city will also add the first all-electric trucks and vans to the fleet.

- The city continues to advance electrification, although delays in vehicle manufacturing due to COVID-19 and global supply chain shortages have slowed the assembly of some vehicles and will continue to impact the delivery of EVs into 2022.

TRANSPORTATION: CITYWIDE ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

THE CITY OF CHARLOTTE HAS INSTALLED AND MANAGES 41% OF ALL CHARGING STATIONS IN CHARLOTTE.



TRANSPORTATION: MOBILITY

FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION AND INCREASE ACCESS TO ZERO-CARBON MOBILITY OPTIONS

- Investments in a walkable, bike-able, and connected Charlotte lower carbon emissions by reducing the need for single-occupancy vehicle trips. Charlotte Department of Transportation (CDOT) is committed to enhancing low and zero-carbon transportation choices which also includes micromobility.

- Sidewalk Funding: The FY 2022 budget more than tripled the amount of planned bond funding for sidewalks from the previous bond cycle - from $15 Million in 2020 to $50 Million planned in the upcoming cycle (not yet voter approved).

- Miles of Sidewalk Installed: The City of Charlotte set a goal to construct 5 miles of sidewalk each year. Over the past 7 years, the City of Charlotte has built approximately 90 miles of sidewalk, averaging a little over 12 miles of sidewalk constructed each year.

- Cross Charlotte Trail: The City of Charlotte is partnering with Mecklenburg County to create a 30+-mile trail and greenway facility that will stretch from the town of Pineville through Center City and onward to the UNC Charlotte campus and Cabarrus County line. Once completed, the Cross Charlotte Trail will allow residents to travel from one end of Charlotte to the other. Approximately 140,000 residents and 130,000 jobs will be within walking distance of the proposed trail and the adjacent greenways. In 2021, the third segment, 7th to 10th, comprised 0.53 miles was completed. The project is expected to be complete in 2028.

- Electric Scooters: One example of micromobility is electric scooters, which provide an opportunity to complement transit service with first/last mile connections, and the potential to replace short vehicle trips with a reduced emission option. In 2021, over 3.5 million trips were taken, resulting in 3.1 million zero emission miles traveled on e-scooters in Charlotte.

TRANSPORTATION: MOBILITY CONTINUED

FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION AND INCREASE ACCESS TO ZERO-CARBON MOBILITY OPTIONS

- Charlotte has nearly 190 miles of bikeways and continues finding ways for cycling to serve as a transportation option for the growing population. In recent years, the city has focused on building an Uptown bicycle network. The Uptown CycleLink is the result of four years of planning, public engagement, and an evaluation of every block and corridor in Uptown Charlotte.

- A study that evaluates the preferred side of the street, facility type, and cross-sections for the Uptown CycleLink is underway. This work will create an All Ages and Abilities (AAA) bike network and transform Charlotte into a world-class bicycle city. Over 20 miles of AAA bikeways and trails are in design. Once the Uptown CycleLink is complete, it will connect over 40 miles of bikeways.

- AAA Bike Facilities Statistics
  - AAA Cycling network as of the end of 2021*:
    - 14.5 miles.
      - 5 miles of Separated Bike Lanes.
      - 9.5 miles of shared use path.

  - Projected AAA Cycling network in the next 5 years*:
    - 65 miles total (increase of 50.5 miles).
      - 17 miles of Separated Bike Lanes (increase of 12 miles).
      - 48 miles of shared use path (increase of 38.5 miles).

*Charlotte Department of Transportation network on streets, not including greenways.

TRANSPORTATION: MOBILITY CONTINUED

FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION AND INCREASE ACCESS TO ZERO-CARBON MOBILITY OPTIONS

2021 BIKE LANE OPENINGS AND IMPROVEMENTS

- Two Uptown CycleLink Segments:
  - Uptown Cycle Track: Converted 2.15 miles of one-vehicle lane along Fifth Street, Sixth Street, McDowell, and 11th Street through Uptown to a two-way, separated cycle track.
  - Davidson Street and Martin Luther King Jr. Boulevard: Converted 0.45 miles of one-vehicle lane and on-street parking bay to a two-way, separated cycle track.

- Parkwood Road Diet: Converted 0.8 miles of one-vehicle lane in each direction of Parkwood Avenue to a separated bike lane between North Davidson Street and The Plaza. This project extends the AAA bike network constructed on The Plaza, and will be further extended in 2022.

- McKee Road, Ballantyne Commons Parkway, and Providence Road Intersection: Added vehicular capacity by constructing additional turning lanes and adding pedestrian and bicycle facilities at the intersection.

- Cross Charlotte Trail Seventh Street and 10th Street Connector: Closed the gap in the Little Sugar Creek Greenway at the interchange of U.S. Route 74 and Interstate 277, by connecting the current trail terminus at Seventh Street near Kings Drive to the existing trail at Greenway Crescent Green near 12th Street. The total project length is 0.5 miles.

- Beatties Ford Road Widening: Constructed approximately 1.5 miles of new, four-lane, divided roadway with sidewalks, planting strips, street trees and pedestrian refuge islands, and a new traffic signal at Capps Hill Mine Road.

- 25th Street Connection: Constructed a bridge along 25th Street that spans the Little Sugar Creek and connects North Davidson Street to North Brevard Street. These improvements will improve accessibility for pedestrians, bicyclists, and motorists by providing a direct street connection between Brevard and Davidson streets, and connecting the Villa Heights neighborhood to the 25th Street Station.

TRANSPORTATION: CHARLOTTE AREA TRANSPORTATION SYSTEM

FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION AND INCREASE ACCESS TO ZERO-CARBON MOBILITY OPTIONS

Investments in the Charlotte Area Transit System (CATS) lower carbon emissions by reducing the need for single-occupancy vehicle trips. CATS has taken action this year for a safer and more sustainable future for Charlotte. Investments include:

- Battery Electric Bus Program: In August 2021, the city executed a Master Service Agreement (MSA) with eTransEnergy, a subsidiary of Duke Energy.
  - This MSA includes multi-phases to full fleet electrification and zero-emission operations of the city's transit bus fleet, including equipment and services needed for this transition.
  - Phase one of this transition is a 12-8-month pilot with 18 battery electric buses (BEBs), which will be entered into revenue service in 2022. CATS will own all buses and infrastructure.
  - Through federal, state, and local funding, CATS is investing $22.8 million in FY 2022 for the program.

- Silver Line Design: After an extensive public, stakeholder engagement process, the MTC adopted a refined Locally Preferred Alternative for the LYNX Silver Line light rail project in April 2021. The proposed Silver Line is 29 miles with 29 stations from the city of Belmont in Gaston County, through Center City Charlotte and the town of Matthews, into Union County.

- CityLYNX Gold Line: Phase two of this streetcar system was completed in 2021.
  - The full line will connect all current and future rapid transit lines, including the LYNX Blue Line light rail, LYNX Silver Line light rail, LYNX Red Line commuter rail and provide a critical connection to the future Charlotte Gateway District and Multimodal Station.

- CONNECT Beyond: a regional mobility plan that provides a blueprint for how to implement a robust, interconnected transportation network combining high-capacity transit lines, enhanced bus service and other innovative mobility solutions. Completed through a partnership between The Centralina Regional Council and the Metropolitan Transit Commission (MTC). The MTC took action in October 2021 to endorse the plan and directed staff to develop a regional work plan.
  - CONNECT Beyond covers a broad area, including 12 counties, two states, four Metropolitan Planning Organizations, one Rural Planning Organization and two state Departments of Transportation.

TRANSPORTATION: CHARLOTTE AREA TRANSPORTATION SYSTEM

FACILITATE THE RAPID UPTAKE OF SUSTAINABLE MODES OF TRANSPORTATION AND INCREASE ACCESS TO ZERO-CARBON MOBILITY OPTIONS

Further investments include:

- The U.S. Department of Transportation announced a $15 million RAISE grant award to the City of Charlotte for the redevelopment of the Charlotte Transportation Center (CTC). The project proposes a vertical mixed-use development, electric bus charging infrastructure, and improved connectivity to the LYNX Blue Line and CityLYNX Gold Line.

- Transit-Oriented Development (TOD): In FY 2021, over 1,200 additional housing units and 826,000 nonresidential square feet was built within transit station areas along the Blue Line.
  - Transit-oriented development, defined as compact, mixed use, walkable, communities focused around transit stations, reduces dependence on automobiles, decreases energy consumption and emissions, and creates a more sustainable development pattern.

- In 2021, CATS created a new position, the first Sustainability, Resiliency and Governmental Affairs Officer to advance climate action and SEAP goals within CATS.

CATS has been recognized as a leader in sustainable transportation in alignment with recent federal initiatives. Some examples include:

- In December 2021, the City of Charlotte hosted an event for Vice President Kamala Harris and Secretary of Transportation Pete Buttigieg at the CATS South Tryon Bus Facility showcasing the first CATS Battery Electric Bus alongside Aviation's Battery Electric Bus and CATS Hybrid Electric Bus. This event highlighted the Bipartisan Infrastructure Plan in support of greater connectivity in infrastructure with clean technologies, like electric vehicles.

- Federal Transit Administration (FTA) Healthy Planet Challenge: Created to encourage transit agencies to further reduce greenhouse gas (GHG) emissions from public transportation to support President Biden's GHG reduction goal. CATS will participate in this challenge with the commitment to develop climate action strategies.

In 2020, the City of Charlotte Aviation Department adopted its Comprehensive Sustainability Plan. The plan will enable Charlotte to become a leader in environmental stewardship by implementing best practices to help minimize the environmental impacts of operations for the benefit of the local community. To read the full report and learn more, go to cltairport.com/sustainability.

The airport currently has five battery electric buses in service to transport passengers to and from the terminals.

After one year of service, these buses have driven over 100,000 miles which has saved over $52,000 in fuel costs.

Five more electric buses are planned to go in service the first quarter of 2022.

These actions support the Airport's plans to replace its 70 diesel-powered buses with 50 electric buses over the next seven to 10 years.

In April, Charlotte Douglas International Airport's Concourse A Expansion – Phase I achieved Green Globes® for New Construction certification, and recognizing sustainability efforts during the design and construction.

The certification affirms the Airport's commitment to current and future building operations best practices, occupant health and wellness, and reducing carbon emissions.

- Concourse A Expansion – Phase I received a rating of "One Green Globes" for sustainable practices such as:
    - View dynamic glazing system (electrochromic glass) that automatically adjusts to provide a higher level of tint during bright conditions, which helps minimize glare and solar heat gain, resulting in passenger comfort enhancement and reduced energy consumption.
    - HVAC system enhancements to improve energy efficiency and indoor air quality.
    - Energy efficient lighting that includes natural lighting in the gate area.

CHARLOTTE WATER

Charlotte Water is the largest public water and wastewater utility in the Carolinas, serving more than a million customers in the City of Charlotte and the greater Mecklenburg County. Charlotte Water pumps, on average, 109.7 million gallons of water everyday, and maintains 8,957 miles of pipes in the region. Charlotte Water is a leader in sustainability, taking on projects that have a measurable impact on the city's goals.

SOLAR ENERGY

Construction began on Charlotte Water's new Zone 4 location, which will feature a photovoltaic solar system that is projected to produce 914,155 kilowatt-hours each year starting in 2022.

COMBINED HEAT AND POWER AND RENEWABLE ENERGY

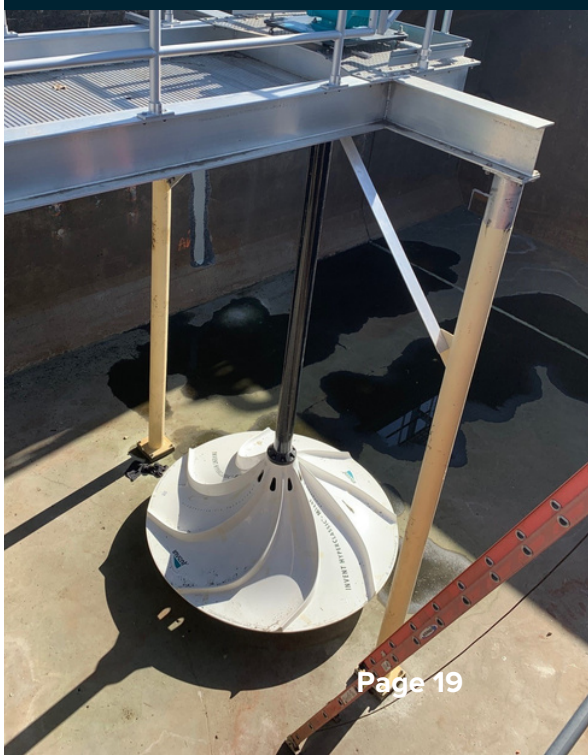
Charlotte Water's Combined Heat and Power (CHP) system is designed to run around the clock and generate renewable energy (pictured top right). This CHP facility at McAlpine was the first CHP system at a wastewater treatment plant in North Carolina. To date, the CHP has generated close to 28,000,000 kilowatt-hours of renewable energy since being constructed. This has resulted in over $1,000,000 in savings and a reduction in carbon emissions that is equivalent to powering over 3.5 million homes in a year.

HIGH EFFICIENCY MIXERS

Charlotte Water is working on a major refurbishment program to improve its McAlpine Creek Wastewater Facility and address the aging of the infrastructure, some of which dates back to the 1960s. The project aims to rehab the heart of the plant, and will involve refurbishing or replacing aeration systems, blowers, and clarifiers and performing recoating of selected elements. One element of this project is installing high efficiency mixers called Hyperboloid Mixers (pictured bottom right). These mixers will save energy and run more efficiently.

PARTNERSHIP WITH UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE (UNCC)

The Mallard Creek Water Recovery Facility Reuse line extension project is in its final phase of completion. This will take nonpotable water to UNCC for irrigation and for use in their cooling towers. This will result in the need to create less water as UNCC will get to use nonpotable water for purposes such as cooling tower makeup water and irrigation.



FINANCE AND BUDGET

MAKING SUSTAINABLE INVESTMENTS

Budget Highlights

Fiscal year (FY) 2022 runs from July 2021 until June 2022. In this budget cycle, City Council made clear their commitment to a low-carbon future for Charlotte through the largest investment ever made in sustainability. See infographic to the left for a snapshot of FY 2022 investments through city funding, planned bonds, and grants.

Financing Firsts

FY 2021 and FY 2022 marked the first time the SEAP was included in the Council-approved Capital Investment Plan (CIP) for sustainable building infrastructure. Long-term financing for the SEAP was included in the 2021B Public Facilities Certificate of Participation (COP).

In addition, 2021 marked the first year the city included information about SEAP in bond offering documents. Details were included in both a Public Facilities COP and a General Obligation debt issuance.

The SEAP calls for city planning processes to incorporate the mission of becoming a low-carbon city.

The Charlotte Future 2040 Comprehensive Plan is a shared, comprehensive vision to guide the Queen City's growth over the next 20 years. The Plan is the foundation for strategic policy, equitable investment in infrastructure, and regulatory tools such as the Unified Development Ordinance.

Charlotte's draft UDO simplifies, consolidates, and updates the regulations that guide Charlotte's development into a single document. In addition, the draft UDO aligns these standards with the vision of the Charlotte Future 2040 Comprehensive Plan and other adopted city policies, like the SEAP.

Some examples of concepts embedded in Charlotte Future 2040 Comprehensive Plan and the subsequent first draft of the UDO include:

- Requiring electric vehicle charging infrastructure for off-street vehicle parking when there are more than 10 parking spaces.
- Added height bonus menu options for High Performance Construction to increase energy efficient buildings and renewable energy.
- Added height bonus menu option for Affordable Housing Equitable Energy Efficient Home Rehab Projects: Fee Program to drive low-carbon investments in affordable housing.
- Enhanced safety and accessibility of transit, bike lanes, and sidewalks to promote micromobility.
- Implementing Resilient Innovation District (RID) programs throughout the city that are responsive to different Place Types and contexts, and promote net-zero development and carbon neutrality.

TREE CANOPY

STRIVE TO REDUCE GREENHOUSE GAS EMISSIONS TO BELOW TWO TONS OF CARBON DIOXIDE EQUIVALENT PER PERSON ANNUALLY

The SEAP states that Charlotte's trees provide a cooling effect to the city, helping to drop temperatures caused by the Urban Heat Island Effect. The canopy also acts as a carbon sink; this means it helps to reduce emissions of carbon dioxide globally.

As of 2018, the tree canopy in Charlotte, comprising approximately 89,433 acres, absorbs approximately 447,610 tons carbon dioxide equivalent per year.* The city's 2019 carbon emissions inventory calculated Charlotte's total emissions at 10,109,000 tons of carbon dioxide equivalent; approximately 4.4% of those emissions are absorbed by Charlotte's canopy.

In addition to direct carbon sequestration, Charlotte trees provide significant shading which reduces the solar heat gain of our buildings resulting in lower energy usage and associated carbon emissions.

Tree Canopy Action Plan

Finalized in early 2021, the action plan is a companion document to the Charlotte Future 2040 Comprehensive Plan, and better defines policies that preserve, restore and enhance the canopy. It continues the work of past tree-related initiatives, including the 2017 Urban Forest Master Plan (UFMP), and guides the upcoming draft Unified Development Ordinance (UDO). In addition, the city plans to review and update Charlotte's tree canopy goal, upon adoption of the UDO.

Tree City USA

Charlotte has been a Tree City USA designated city for 42 years. This is one of the Arbor Day Foundation's oldest programs.

The Tree City USA program provides communities with a four-step framework to maintain and grow their tree cover. It also gives them an avenue to celebrate their work, showing residents, visitors, and the entire country that they're committed to the mission of environmental change.

*From The Center for Watershed Protection, Inc. Existing Canopy Conditions within the City of Charlotte, https://publicinput.com/Customer/File/Full/e2aa86d2-f7aa-4426-a466-5123a154b904

2021 GRANTS, AWARDS, AND RANKINGS

RESEARCH TRIANGLE CLEANTECH CLUSTER™
» Transformation Through Collaboration

EQUITY IN CLEANTECH AWARD

Charlotte Area Transit System (CATS) Electric Bus Program

The CATS electric bus pilot program is focused on bringing cleaner air to residents of the Charlotte-Mecklenburg region with battery electric buses. This electric bus partnership will prioritize the city's "Corridors of Opportunity" with selection of bus routes. This pilot project supports both the city's ambitious climate goals and will provide public health benefits throughout the region. CATS serves as a model for other municipalities and transit agencies around the country.

EPA United States Environmental Protection Agency

CHARLOTTE RANKS NO. 19 ON EPA'S 2021 LIST OF TOP CITIES WITH ENERGY STAR-CERTIFIED BUILDINGS

The U.S. Environmental Protection Agency (EPA) has ranked Charlotte as 19th on its 2021 list of U.S. metropolitan areas with the most ENERGY STAR-certified buildings. Cities were ranked according to how many buildings in their area achieved ENERGY STAR certification in 2020. The ranking confirms the Charlotte community's commitment to following best practices, technical guidance and training, and becoming a leader in sustainability.

U.S. GREEN BUILDING COUNCIL USGBC

LEED FOR CITIES AND COMMUNITIES: GOLD

LEED for Cities and Communities certification recognizes cities that create responsible, sustainable, and specific plans for natural systems, energy, water, waste, transportation, and many other factors that contribute to an improved quality of life. Charlotte achieved LEED for Cities Gold certification for implementing practical and measurable strategies and solutions aimed at improving sustainability and the standard of living for residents.

U.S. DEPARTMENT OF ENERGY

AFFORDABLE MOBILITY PLATFORM (AMP)

Forth, a non-profit whose mission is to electrify transportation by bringing people together to create solutions that reduce pollution and barriers to access, was awarded a $5 million grant from the US Department of Energy, and the City of Charlotte was selected as a partner. This grant will fund the AMP Project to reduce the barriers to electric vehicle adoption facing underserved communities, particularly residents of affordable housing. It will: Increase access to clean, affordable transportation to residents of affordable housing developments; demonstrate a replicable model for affordable housing agencies to offer EV carsharing using fleet vehicles as a transportation service to their residents; and demonstrate how dedicated carsharing chargers can also serve community members, effectively improving the regional charging network.

ACEEE American Council for an Energy-Efficient Economy

2021 CITY SCORECARD: MOST IMPROVED CITY

The 2021 City Clean Energy Scorecard

This report scores 100 U.S. cities on their efforts to advance their clean energy goals by improving energy efficiency and moving toward a cleaner electric grid and fuels. Madison, Wisconsin; Charlotte, North Carolina; and Honolulu, Hawai'i, are this year's most-improved cities. In 2020, Charlotte was ranked 65 out of 100 cities, and in 2021, Charlotte jumped to 42 out of 100.

ENGAGEMENT

EMPLOYEE

SEAP OPERATIONS TEAM

Tackling carbon reduction goals takes teamwork, accountability, and collaboration. The SEAP Operations Team has been a standing leadership group since early 2019 and is comprised of representatives of more than 20 city departments who meet regularly throughout the year to connect on goals and initiatives for a low-carbon Charlotte. This group provides a critical perspective to advance the SEAP by providing department-specific input. In 2021, this group focused on information sharing and input on the implementation and development of the following initiatives:

- Sustainable Facilities Policy
- Charlotte Future 2040 Comprehensive Plan
- Draft Unified Development Ordinance
- Strategic Mobility Plan
- Tree Canopy Action Plan
- CATS Battery Electric Bus Pilot
- LEED for Cities
- Federal Policy: Infrastructure Bill

ENGAGEMENT

COMMUNITY

SEAP EXTERNAL CONTENT GROUPS

Understanding that the city cannot accomplish its goals alone, the SEAP calls for stakeholders from key sectors to engage with city staff for partnership, collaboration, and action to reduce emissions. Meetings are held quarterly. Visit charlottenc.gov/seap for more information.

Topics covered this year included the Charlotte Future 2040 Comprehensive Plan, the draft Unified Development Ordinance, greenhouse gas emissions inventory, and more.

Two impactful initiatives completed in 2021:

GREENING OUR FAITH COMMUNITIES SUMMIT

- A two-day virtual summit that took place in May 2021 to bring together houses of worship and people of faith to provide inspiration and tools for engaging in climate change work.
- The idea for this summit stemmed from the SEAP External Content Group and the city acted as a partner for the planning and implementation of the summit.
- Funding for this summit was provided by the Energy Foundation, an American Cities Climate Challenge partner.
- The summit had 195 registrants, representing 44 different congregations in Charlotte.

FRAMEWORK FOR FUTURE'S SEAP YOUTH AMBASSADOR PROGRAM

- Framework For Future (F4F) is a 501(c)(3) nonprofit organization for young leaders in Charlotte.
- Through the SEAP External Content Group, representatives from F4F and the University of North Carolina at Charlotte implemented a six-week Youth Ambassador Program to educate and engage local students in sustainability solutions. This program wrapped up in February 2021.

ENGAGEMENT

COMMUNITY

ANHEUSER-BUSCH SUSTAINABILITY PARTNERSHIP

In February, the City of Charlotte announced a partnership with Anheuser-Busch that debuted a sustainable beverage can made with a first-of-its-kind, low-carbon technology.

As a result of this partnership, Anheuser-Busch donated renewable energy credits to the city. They donated the equivalent of electricity used to power all city-owned facilities for a week, which is equal to more than eight million kilowatt-hours. In February, people in Charlotte were able to purchase the low-carbon cans as part of a pilot with Michelob ULTRA. More than 2.5 million of the innovative low-carbon cans hit shelves across North Carolina.

In a first for the canned-beverage industry, Anheuser-Busch announced a global partnership with Rio Tinto to produce cans that are infinitely recyclable and made from responsibly produced, low-carbon aluminum.

According to Anheuser-Busch, these low-carbon cans are the first in the world to be made using metal produced through a revolutionary, zero-carbon, aluminum-smelting process. This technology eliminates all direct greenhouse gases from the aluminum-smelting process, and instead produces oxygen.

In leveraging this metal, combined with Rio Tinto's low-carbon aluminum made with renewable hydropower and recycled content, Anheuser-Busch produced its most sustainable beer can yet. It reduced carbon emissions by more than 30% per can, compared to the brewer's 2019 aluminum-can baseline.

CHARLOTTE IN THE NEWS

Politics & Government

City Of Charlotte: City Of Charlotte Named LEED Gold City ...

Winning Cities From the Bloomberg American Cities Climate Challenge on Track to Collectively Reduce Emissions By 32 Percent and Surpass 2025 Paris Goals

City of Charlotte transitioning fleet to electric vehicles

Charlotte's climate action cleans air and spurs economy

By Irene Nielson March 2, 2021

RENEW is the city of Charlotte's workforce development program for building efficiency, HVAC and solar installation training.

Solar panel installation contract approved

Charlotte City Council approves $1.6 million contract to bring solar panel systems to 10 city-owned facilities.

Government & Regulations

City Council approves electric bus pilot program, paving the way for a 2022 rollout

LOCAL NEWS

Kamala Harris, Pete Buttigieg tout Biden infrastructure law during Charlotte visit

Vice President Kamala Harris said Charlotte deserves "world-class transit systems" while promoting President Joe Biden's infrastructure bill Thursday.

Community

Charlotte City Council passes Sustainable Facilities Policy (USGBC North Carolina)

2022 LEGISLATIVE AGENDA

ON NOVEMBER 22, 2021 CITY COUNCIL ADOPTED ITS LEGISLATIVE AGENDA. SEVERAL ITEMS PLAY A SIGNIFICANT ROLE IN SUPPORTING THE REDUCTION OF GREENHOUSE GAS EMISSIONS.

STATE

Mobility: Continue working with key stakeholders to support legislation that provides dedicated, stable, and permanent sources of revenues for state, regional, and local public transportation, roadway, bicycle, pedestrian, passenger rail, greenway, and safety capital improvement projects.

Infrastructure and Community Needs: Work with the Governor and General Assembly to allocate federal resources received by the State to advance needs related to aviation and surface transportation, housing, environmental, digital inclusion, workforce development, climate change, and resiliency and sustainability issues.

FEDERAL

Infrastructure and Community Needs: Continue working with the Congress and Administration to secure federal resources to advance local and regional infrastructure needs related to aviation, surface transportation, rail, environmental, sustainability and resiliency, cybersecurity, digital inclusion, affordable housing, workforce development, community development and public safety.

PROGRESS TOWARDS 2030 AND 2050 GOALS

2030 GOAL: STRIVE TO HAVE CITY FLEET AND FACILITIES BE FUELED BY 100% ZERO-CARBON SOURCES BY 2030.

2050 GOAL: CHARLOTTE WILL STRIVE TO BECOME A LOW CARBON CITY BY 2050 BY REDUCING GREENHOUSE GAS EMISSIONS TO BELOW TWO TONS OF CARBON DIOXIDE EQUIVALENT PER PERSON ANNUALLY.

This report contains a range of information and statistics on progress. The following pages contain snapshots to show advancement towards the 2030 and 2050 SEAP goals.

The municipal energy grid mix presents the breakdown of the City of Charlotte's municipal energy usage in 2021 by carbon emitting vs. zero carbon emitting energy. As the city is working to transition fleet to electric, actions are underway to reduce overall energy usage. Efforts include procuring renewable energy, and engaging with Duke Energy and the North Carolina Utilities Commission, all of which support closing the zero-carbon gap towards the 2030 goal.

The 2019 communitywide greenhouse gas emissions inventory shows a 5.8% decrease in emissions per capita from 2015 levels. Continuing to collectively decrease communitywide emissions will help all of Charlotte to become a low carbon city by 2050.

SEAP
STRATEGIC ENERGY ACTION PLAN
CITY of CHARLOTTE

MUNICIPAL ENERGY GRID MIX

STRIVE TOWARD 100% ZERO-CARBON ENERGY FOR MUNICIPAL BUILDINGS BY 2030

Charlotte has made significant progress towards powering its buildings with 100% zero-carbon energy by 2030. The city continues to follow the Five Stages to Zero-Carbon Energy approach, as outlined in the SEAP:

1. Shifting energy demand.
2. Reducing energy consumption.
3. Changing energy we consume away from fossil fuels.
4. Generating energy on-site.
5. Meeting the remainder through energy purchases.

Some strategies the city has taken to advance the Five Stages to Zero-Carbon Energy approach are:

- Energy efficiency projects such as retro-commissioning and LED retrofits to reduce energy consumption.
- Procurement of utility-scale solar energy, such as the Green Source Advantage Program.
- Implementation of the Sustainable Facilities Policy, leading to an increase in on-site solar, as well as a reduction in overall energy usage in municipal buildings.
- Exploring battery storage options.
- Advocacy for a low carbon grid at the North Carolina Utilities Commission.
- Continued partnership with Duke Energy.

By progressing on the Five Stages to Zero-Carbon Energy approach and the strategies listed above, the City will continue to close the "Zero-Carbon Gap" (shown below) to reach the 2030 SEAP goal.

The below is based on 2021 City of Charlotte municipal energy usage. The city consumed approximately 443,007 MWh of energy in the buildings sector in 2021.

Zero-Carbon Gap: Amount of carbon-emitting energy that the City of Charlotte will need to account for or offset by 2030 to reach SEAP goals.

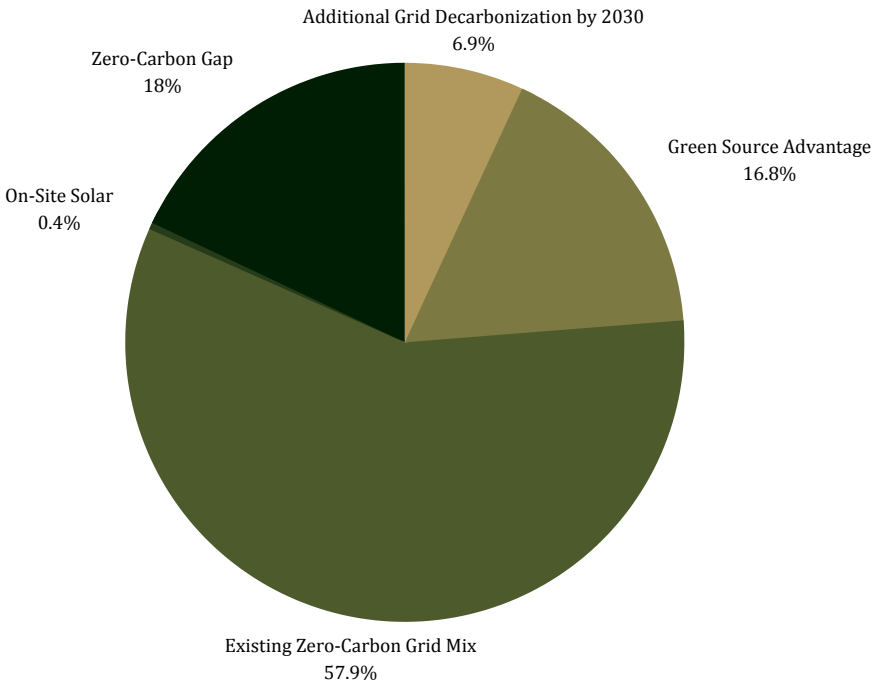
Additional Grid Decarbonization by 2030: Amount of energy Duke Energy currently plans to decarbonize by 2030 based their own stated goals.

Green Source Advantage Program: Planned 35 megawatt utility scale solar system for municipal energy.

Existing Zero-Carbon Grid Mix: Amount of municipal energy usage from Duke Energy that is already zero-carbon, including solar, hydro, nuclear.

On-Site Solar: Planned for and budgeted future on-site municipal solar that is not yet operational. Note: the city's existing on-site solar energy and energy efficiency measures are reflected by a reduction of overall energy, thereby making the entire pie chart smaller.

2030 Zero-Carbon Buildings - 2021 Progress Snapshot



The above pie chart depicts the breakdown of the City of Charlotte's municipal energy usage in 2021. The black slice represents the "gap" of carbon-emitting energy that the city is striving to account for or offset by 2030. The remainder of the pie chart depicts current or expected future zero-carbon energy by 2030.

2019 GREENHOUSE GAS EMISSIONS INVENTORY

SEPTEMBER 2021

Prepared by the City of Charlotte and Carbon Captured Ltd.

The City of Charlotte worked with Carbon Captured Ltd. to update the 2019 greenhouse gas emissions inventory. Carbon Captured Ltd. has developed inventories and provided trainings with cities and regions in 16 countries. Their Director has also been the expert scientist to the EU's Committee of Regions on this topic.

BACKGROUND

In 2018, Charlotte City Council unanimously adopted the Strategic Energy Action Plan (SEAP), which sets a communitywide goal of reducing greenhouse gas (GHG) emissions to less than 2tCO_2e (two tons of carbon dioxide equivalent) per capita by the year 2050, keeping in alignment with the Paris Climate Agreement. The city uses CO_2e, or carbon dioxide equivalent, as the standard unit for expressing GHG emissions to quantify the climate change potential of all greenhouse gases in terms of CO_2.

The SEAP outlines a set of strategies on how to reduce communitywide emissions for a more sustainable, resilient, and equitable future for Charlotte. Accomplishing the carbon reduction goals outlined in the SEAP has the potential to stop the release of up to 240 million tons of carbon dioxide equivalent by 2050. In addition to addressing climate change, the SEAP spurs economic innovation, improves public health, and creates quality jobs for Charlotte.

Conducting emissions inventories is a critical step to identify emission sources, enable progress, and track changes over time. The data in a GHG emissions inventory prioritizes actions to reduce emissions and informs future strategies and next steps. The last inventory for Charlotte, conducted in 2019, used 2015 data and was the cornerstone of SEAP strategies.

PROGRESS

Based on the most recent 2019 data, Charlotte's communitywide emissions are 11.65tCO_2e per capita. This is a 5.8% decrease in emissions per capita from 12.37tCO_2e in 2015. This decrease is influenced by the reduction in the carbon intensity of electricity generation and an increase in population. Since the adoption of the SEAP in December of 2018, the city has been taking bold actions to reduce GHG emissions both at the municipal level, as well as communitywide.

At the municipal level, Charlotte is focusing on modeling electric vehicle use, emphasizing mode shift in infrastructure investments and planning efforts, increasing the amount of new solar energy in our region, and partnering with local corporations to strengthen the clean energy economy through equitable workforce development programs. With strong public and private actions, future emissions inventories will reflect a continued decrease as our community strives towards the SEAP 2050 goal to become a low carbon city.

SECTOR BREAKDOWN

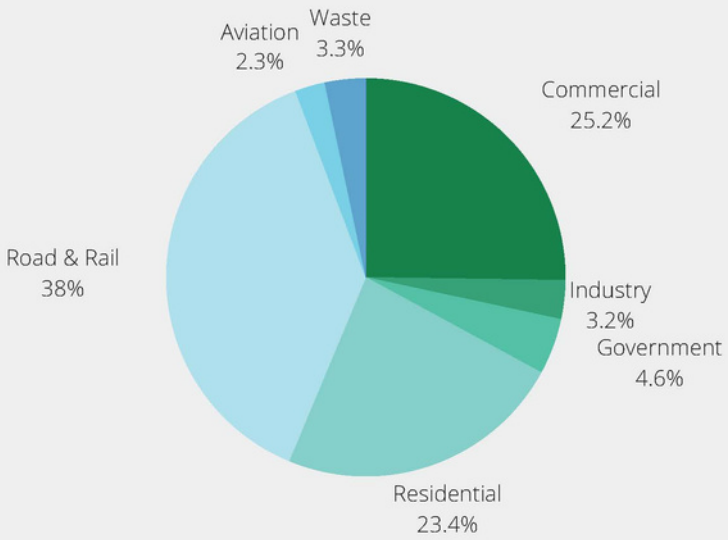
The below GHG emissions inventory is calculated and reported in accordance with the Global Protocol for Cities (GPC) and the Global Covenant of Mayors for Climate and Energy, a global cooperative effort among mayors and city officials to reduce GHG emissions. The communitywide GHG emissions inventory is compliant with the GPC BASIC level of reporting.

As shown in both the 2015 and 2019 emission data, Charlotte's largest emitting sector is transportation. Road and rail transportation now account for 40% (up from 38% in 2015) of the total emissions. This is in part due to Duke Energy's increased use of renewables to power buildings, thereby lowering the emissions in several other sectors. In addition, more internal combustion engine vehicles on the road contribute to increased emissions.

The commercial, government, and residential sectors listed below include GHGs emitted from the electricity and natural gas use in buildings - specifically personal homes, businesses, and public buildings. The industry sector includes GHG emissions from local generators, construction, and any other energy or electricity used to enable large energy consumers, like factories, to operate. Waste includes nitrous oxide emissions from wastewater treatment and methane from food waste in landfill sites. Aviation refers to aviation emissions, related to fuel used for domestic flights.

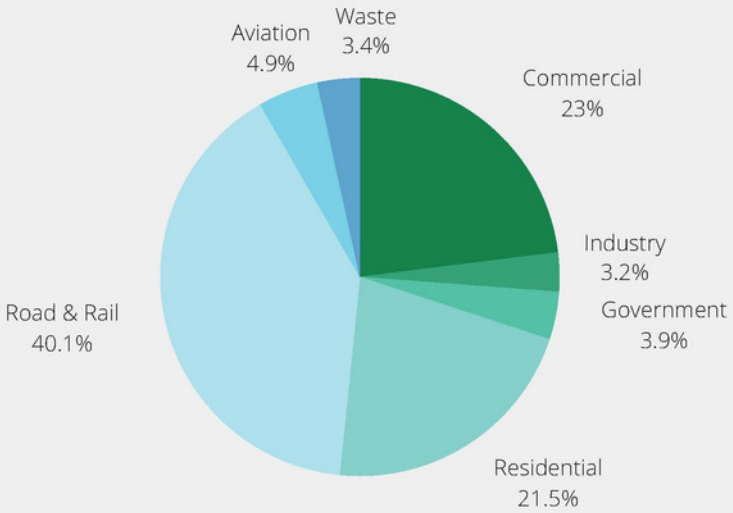
Community-wide GHG Emissions for Charlotte

2015



Total GHG Emissions
10,414,000tCO_2e
12.37tCO_2e per capita

2019



Total GHG Emissions
10,109,000tCO_2e
11.65tCO_2e per capita

2022

UPCOMING GOALS

BUILDINGS

- Implementation of the Sustainable Facilities Policy across all city-owned facilities.
- Collect and refine data for second annual benchmarking report to share energy usage across city buildings.

ENERGY GENERATION

- Begin construction on five more solar panel installations at city facilities, funded by the FY 2022 budget, including one with new battery storage technology in partnership with local Joules Accelerator program.
- Continued engagement with Duke Energy and North Carolina Utilities Commission to influence low-carbon outcomes.

WORKFORCE DEVELOPMENT

- Continue training participants in the Renewable Energy and Efficiency Workforce (RENEW) Training Program through Urban League and Goodwill Industries.
  - Connect local employers with RENEW graduates to make hires.
- Advance training city staff on sustainable technologies, including battery electric buses and other low-carbon vehicles.

IMPLEMENTATION AND ENGAGEMENT

- Leverage internal and external SEAP stakeholder groups to advance 2030 and 2050 SEAP goals.
- Select winner of Leading the Charge Decal Competition for college students in Mecklenburg County. Place winning design on all city and county low- and no-emission vehicles.
- Implement the Affordable Mobility Platform (AMP) Project in partnership with Housing and Neighborhood Services and local housing partners to reduce the barriers to EV use and adoption for residents of affordable housing through an innovative car-share model.

TRANSPORTATION

- Continue replacing internal combustion engine vehicles with electric vehicles (EVs) across city fleet in accordance with Sustainable Fleet Policy.
- Continue to install EV chargers across city facilities, including the expansion of charging at the Charlotte Mecklenburg Government Center parking deck.
- Implement PoleVolt Pilot: The City of Charlotte, the University of North Carolina at Charlotte, Duke Energy, and Centralina Regional Council partnered to pilot an EV utility pole-mounted charger in two locations, with a geographic focus on "Corridors of Opportunity."

SEAP

STRATEGIC ENERGY ACTION PLAN

CITY of CHARLOTTE

Read the full SEAP at www.charlottenc.gov/seap.

CLTSustainable

CLTSustainability