CLIMATE ACTION PLAN

AN EQUITABLE STRATEGY FOR A HEALTHIER FUTURE

Charleston
SOUTH CAROLINA

MAY 2021


West
Ashley
Greenway

CONTENTS

ON THE COVER

The Lowcountry's marsh ecosystems are powerful carbon sequestration assets. For more information about our carbon sinks, **see page 24.**

Photo credit: The Nature Conservancy

VISION

Our vision is to substantially reduce carbon pollution in an equitable way and improve the health and quality of life of Charlestonians now and in the future.

A | INTRODUCTION

EXECUTIVE SUMMARY

This five-year Climate Action Plan reflects the latest science, aligns with international standards for greenhouse gas (GHG) reduction, is synergistic with other City plans, and emphasizes the importance of ongoing, equitable community engagement.

Both climate adaptation and mitigation solutions are important to achieve community resilience. Since adaptation measures (those that better prepare our community for the impacts of climate change) are the primary initiatives in the City's Flooding and Sea Level Rise Strategy, the Climate Action Plan builds on that base by focusing on climate mitigation measures to reduce emissions and ultimately address the root cause of climate change.

Implementation of the Climate Action Plan will put us on a path to achieving the following short and long term science-based emission reduction goals:

- **Reduce emissions 56% below 2018 levels by 2030**
- **Reduce emissions to net zero by 2050**

The strategies and initiatives to achieve the above goals are summarized within each chapter.

PURPOSE

Charleston's Climate Action Plan acknowledges the risks that climate change poses and lays out innovative strategies and actions to reduce GHG emissions, the "carbon footprint," of both our City government operations and the community at large. The plan calls for common sense approaches and recommends cutting-edge policies to curb climate change. Its adoption will open the door to an array of local benefits and help set a new standard for cities nationwide, potentially globally. Our ultimate goals: to reduce energy use and waste, create local jobs, improve air quality, preserve our local landscape and history, and reduce climate-related risk to people and property for years to come.

This plan enhances the City of Charleston's participation as a signatory of Climate Mayors, a coalition of 470 municipalities committed to addressing climate change at the local level.

OUR CLIMATE CHALLENGE

The city of Charleston is a small community at the confluence of two rivers that empty into the Atlantic Ocean. It is a special place with a demonstrated civic conscience. The effects of climate change on our community has intensified our City's civic mandate. And while Charleston represents only one small piece of this global crisis, we must do our part to preserve our health, our economy, and the natural world that supports us.

With this in mind, Charleston has challenged itself with an unprecedented call to environmental action — a commitment today to make substantial change in our use of energy, leading to a cleaner, healthier, sustainable tomorrow. The Climate Action Plan outlined here represents a start. It is a framework for a wide-ranging shift in our everyday approach to life.

As this report suggests, there is really little choice. Overuse of fossil fuels has already given rise to an array of flooding, rain bombs, wildfires, landslides, spiking heat waves, droughts, and the threat of global food shortages. In Charleston, we see more flooding, more extreme storms, more sea level rise. Locally, there is much that we can do.

Because we burn too much fossil fuel, carbon dioxide (CO_2) and methane (CH_4) emissions are accumulating rapidly in the atmosphere, creating a greenhouse effect (hence, greenhouse gases), that overly warms the earth; this in turn has led to changes in climate patterns. In fact, human-caused carbon emissions reached a peak in the early part of the 21st century, produced primarily by the energy and transportation sectors of the economy. If predictions about population growth, reliance on personal vehicles, and urbanization hold true, these emissions could double by 2050 —fewer than three decades from now.

With some 80% of Americans living in urban areas, cities can play a powerful role in addressing climate change. The design of our cities—how we use land, design buildings, and move around— relates directly to the amount of energy we use and the volume of GHG emissions we produce. (Another 1.5 billion people are likely to populate the world's cities, many in the developing world.) If we choose to, Charleston could demonstrate how to dramatically reduce GHG emissions while creating a more vibrant and prosperous place to live and work.

COMMUNITY ENGAGEMENT PROCESS

The City of Charleston recognizes that active and ongoing collaboration with the community is necessary to advance climate action and sustainability. For this action plan to be implemented, it is imperative the residents of Charleston support it and therefore play a critical role in creating the content of the strategy.

A robust community engagement process began in fall 2020 and lasted six months. An initial survey and public meeting to gather community feedback kicked off the start of the project. The Office of Resilience and Sustainability also created six new working groups to guide the content of the action plan. The working groups were made up of a diverse group of community members who volunteered their time all winter participating in group meetings. Members included residents, business owners, developers, designers, stakeholder groups, technical experts and City elected officials and staff.

The new **Climate Action Plan Taskforce** led the initiative with leadership support from the Resiliency and Sustainability Advisory Committee and City Council.

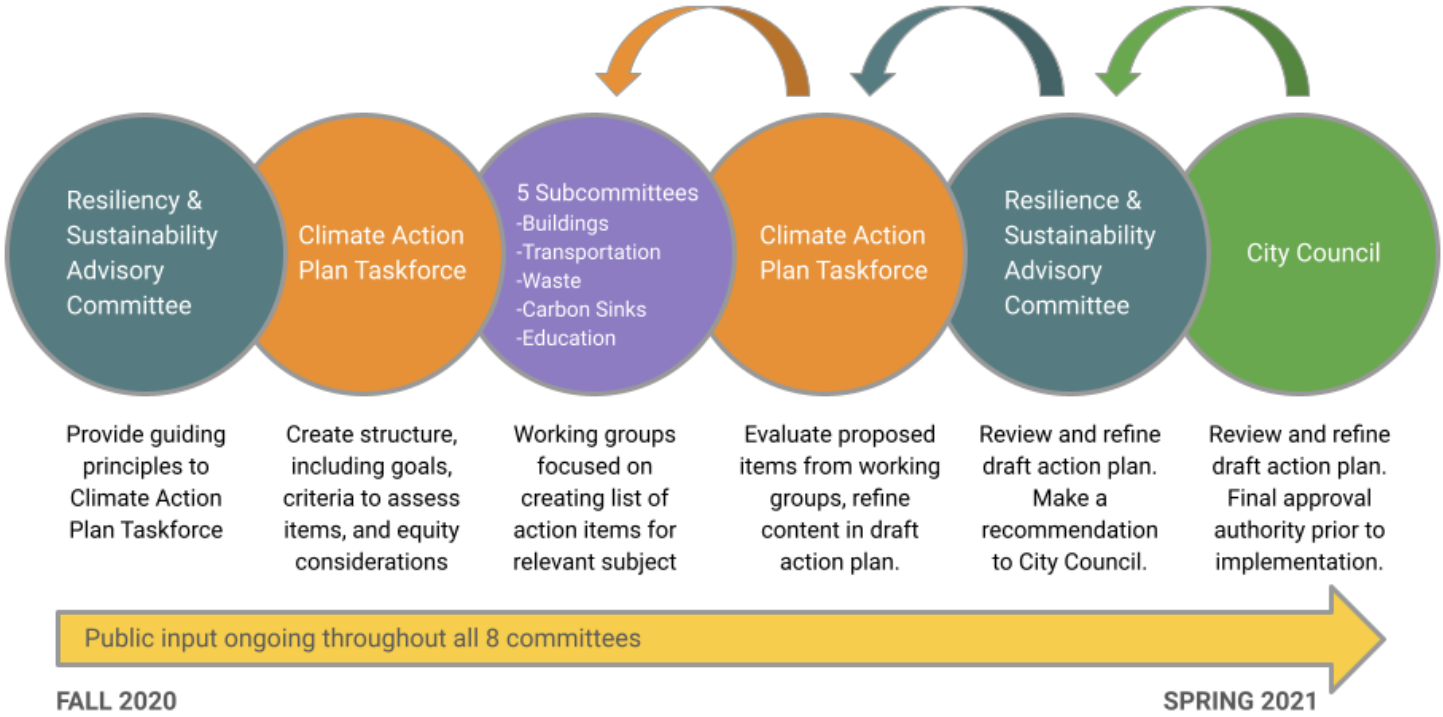
Five subcommittees were formed to dive deeply into specific subject areas and create the first draft of the action list.

1. Buildings Subcommittee
2. Transportation Subcommittee
3. Waste Subcommittee
4. Carbon Sinks Subcommittee
5. Education & Community Engagement Subcommittee

A second community survey and public meeting were held in March 2021 to gather community feedback on the draft strategies and actions the committees worked on all winter.

The Climate Action Plan Taskforce and the Resiliency and Sustainability Advisory Committee reviewed recommendations from the subcommittees and the public feedback, ultimately forming and supporting the content in the final action plan.

FIGURE 1: CLIMATE ACTION PLANNING PROCESS



CREDITS AND ACKNOWLEDGMENTS

This report was completed in April 2021 by the City of Charleston's Office of Resilience and Sustainability with support from ICLEI Local Governments for Sustainability.

Special thanks to all the community members, elected officials and technical experts who volunteered their time serving on committees to help shape the action plan:

RESILIENCY & SUSTAINABILITY ADVISORY COMMITTEE

Christine von Kolnitz
CM Carol Jackson
CM Dudley Gregorie
CM Kevin Shealy
Danny Kassis
Doug James
Kendra Stewart
Mark Messersmith
Mayor John Tecklenburg
Rick DeVoe
Ron Mitchum
Scott Barhight
Stewart Weinberg

CLIMATE ACTION PLAN TASKFORCE

Aaron Bowman
Amber Johnson
Belvin Olasov
Ben Brownlee
Bill Eubanks
Bill Knight
Brandon Markland
Christine von Kolnitz
CM Karl Brady
CM Marie Delcioppo
CM Mike Seekings
Danielle Richardson
Danny Kassis
Darcy Everett
Dennis Knight
Eddy Moore
Edgar Sada
Ian Sanches
Jonatan Guerrero Ramirez
Joshua Robinson
Katie McKain
Kelly Thorvalson
Libby Smith
Marcus McDonald
Mark Wilbert
Minister Sonya Buncum
Omar Muhammad
Ray Huff
Rev. Dr. Brian Henderson
Stewart Weinberg

BUILDINGS SUBCOMMITTEE

Aaron Bowman
Adam Baslow
April Magill
B.D. Wortham-Galvin
Belvin Olasov
Bill Knight
Brian Turner
Bryan Cordell
Chloe Stuber
Chris Carnevale
Christine von Kolnitz
CM Mike Seekings
CM Ross Appel
Craig Knowlton
Dan Battista
Darcy Everett
Dennis Knight
Drew Gravitt
Eddy Moore
Edgar Sada
Edmund Most
Eric Pohlman
Erin Minnigan
Jeffrey Roberts
John Morris
Josh Dix
Joshua Robinson
Katie McKain
Ken Granata
Kim Hlavin
Kindall Brantly
Kristopher King
Lilli Butterfield
Omar Muhammad
Patrick Head
Ray Huff
Richards Gregory
Stacey Barrington
Stewart Weinberg
Tammy Coghill
Tommy Manuel
Wes Chappell
Winslow Hastie

TRANSPORTATION SUBCOMMITTEE

Andrea Melocik
Ben Kessler
Brandon Markland
Chip Wyatt
Chris Carnevale
CM Karl Brady
CM Mike Seekings
Edgar Sada
Jason Crowley
Jennifer Humphreys
Jim Hamilton
Jonathan Guy
Katie McKain
Katie Zimmerman
Keith Benjamin
Kyle James
Philip Overcash
Rev. Cameron Smith
Savannah Weeks
Scott Parker
Sharon Hollis
Steve Dudash
Stewart Weinberg
Westy Westmoreland

WASTE SUBCOMMITTEE

Adelaide Bates
Alec Cooley
Beezer Molten
Betsy LaForce
Cheryl Carmack
Chip Wyatt
Christina Moskos
Christine von Kolnitz
CM Karl Brady
Edgar Sada
Erin Dovey
Ian Sanches
Jonatan Guerrero Ramirez
Karalee Nielsen Fallert
Katie McKain
Kelly Thorvalson
Lia Collabello
Lucy Davis
Marlo
Matt Alltop
Natasha Viswanathan
Renee Orth
Shawn Smetana
Stacey Bailey
Stewart Weinberg
Vikki Matsis
Wyatt Ball

CARBON SINKS SUBCOMMITTEE

Amy Scaroni
Belvin Olasov
Bill Eubanks
Bridget Lussier
Clark DeCiantis
Connor Fraser
CM Carol Jackson
David Quick
Doug Hatler
Edgar Sada
Enrique Grace
Erin Smith Stephens
Grace Lewis
Jessica Norris
Joey Buzby
Katie McKain
Kim Morganello
Kristin Miguez
Libby Smith
Liz Fly
Patrick Dollason
Sharon Richardson
Steve Dudash
Stewart Weinberg
Vanessa Gongora
Wyatt Ball

EDUCATION SUBCOMMITTEE

Anya Breitenbach
Arian Bonetto Fernandez
Ashley Hampton
Ben Brownlee
Bill Knight
Bridget Lussier
Caroline Rothkopf
Danielle Richardson
David Quick
Deborah Batzer
Derrick Milligan
Edgar Sada
Evan Shea
Jamie Gillette
Jasmine Gil
Jen Wright
John Mitchell
Julia Piermattei
Katie McKain
Leslie Skardon
Lisa Gethard
Merrie Koester
Omar Muhammad
Rachel Kelley Barry
Sara Rutledge
Scott Curtis
Stewart Weinberg
Susan Lyons

OUR GREENHOUSE GAS EMISSIONS

CITYWIDE INVENTORY

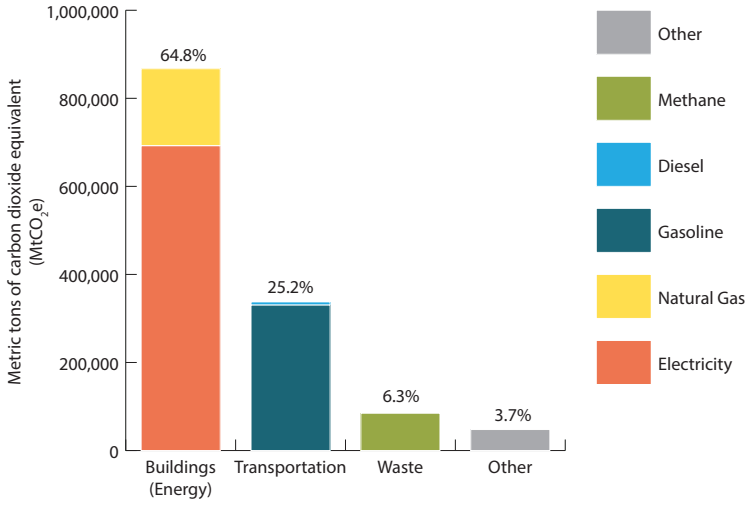
In 2018, the total emissions citywide (within City of Charleston limits) were 1,337,254 metric tons of carbon dioxide equivalent ($MtCO_2e$).

Buildings accounted for nearly 65% of citywide emissions at 867,200 $MtCO_2e$ and remain the largest sector of pollution citywide.

Citywide Emissions are tracked within four distinct sectors:

1. **Buildings** includes energy use in residential, commercial, government, and industrial buildings.
2. **Transportation** includes emissions from cars, motorcycles, and trucks, but not boats, ships, planes or rail, whose contributions could not easily be estimated.
3. **Waste** includes landfill emissions from residential, commercial, and government waste picked up by City haulers.
4. **Other** includes direct emissions from industries that are not fully captured by the above categories. Life cycle emissions from products and services consumed could not be easily estimated and are not included.

FIGURE 2: CITYWIDE 2018 GHG EMISSIONS BY SECTOR AND SOURCE



GOVERNMENT INVENTORY

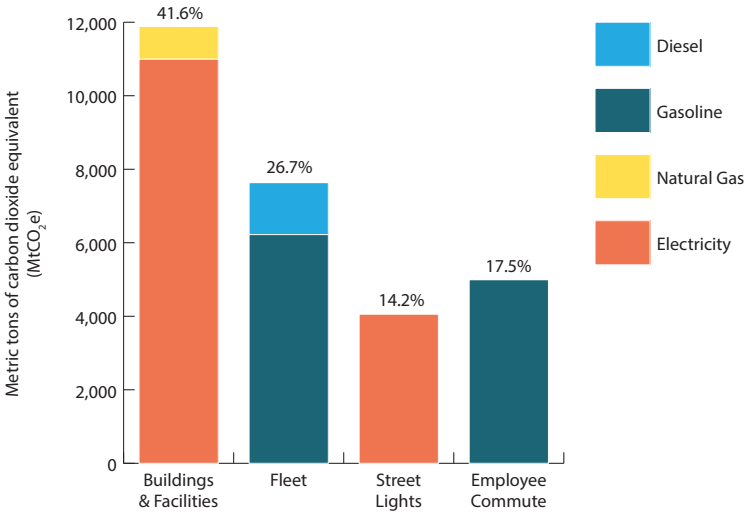
In 2018, the total emissions from City of Charleston government operations were 28,568 $MtCO_2e$.

Government emissions seem separate but are calculated into the citywide emissions inventory too. **Government operations make up 2% of total citywide emissions.**

Government Emissions are tracked within four distinct sectors:

1. **City buildings** include all City offices and facilities and their associated lighting, such as ball field and parking lights.
2. **Street lights** include light poles that line our streets.
3. **Fleet** includes all vehicles in the City fleet, such as cars, trucks, and major construction equipment. This figure includes police and fire public safety vehicles too.
4. **Employee commute** includes employee transportation to and from work.

FIGURE 3: GOVERNMENT 2018 GHG EMISSIONS BY SECTOR AND SOURCE



For a detailed report of Charleston's greenhouse gas emissions, visit https://www.charleston-sc.gov/DocumentCenter/View/27531/Greenhouse-Gas-Inventory-FY-2018

LIFE CYCLE EMISSIONS

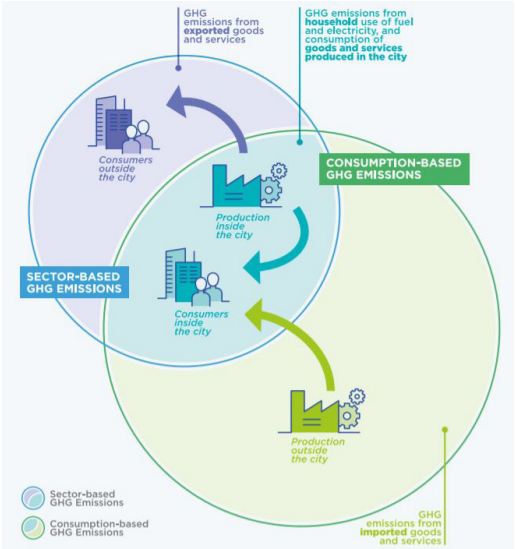
Charleston's greenhouse gas inventory is a sector-based inventory and identifies emissions from where they are produced. It is important to note there are also life cycle emissions from the production of products and services that are not easily calculated. The sector-based inventory does not account for global carbon emissions that result from local consumption of goods that were produced in other places (i.e. cell phones, clothes, furniture, food) and services (i.e. health care, banking).

Life cycle carbon emissions are the net carbon emissions produced throughout the life of individual products and services — "cradle to grave." Life cycle emissions include the upstream emissions that come from: (1) producing and distributing a product before it's ever purchased by a consumer, (2) the use of the product and (3) decomposition of the product in a landfill.

Let's take, for example, a cell phone. To produce a cell phone, fossil fuels and metals are extracted and processed into plastics and other raw materials. Electrical components and computer chips also need to be manufactured. Those components are shipped and assembled into the final product. Once the product is created it is shipped and distributed to wholesalers and retailers, often all over the world. It is transported again when it is purchased by a consumer. Once the consumer begins using the cell phone, it directly uses energy, generating carbon emissions for the rest of its life. Then there are transport emissions to dispose of the product too, and even though some phones can be recycled, many end up in our landfills. So think twice before upgrading a cell phone, washing machine or car to the latest and greatest model and remember there is a lot of embodied carbon in products and services.

Remember:

- **WHAT WE BUY MATTERS.** Some studies now show the consumption of food, goods and services can account for up to 50% of a household's emissions, with the majority of those emissions coming from the production of goods and services, followed by emissions from the actual use.
- **GOODS VS. SERVICES.** Goods generally have a greater carbon intensity than services, but there are some exceptions. For example, airplane travel produces a high amount of pollution.



Consumption based emissions include those associated with the production of goods and services produced outside of Charleston but imported for consumption by residents. Source: C40 Cities

The most sustainable building is the one that is already built. This is due to all the embodied carbon from the materials and construction.

Charleston has a long history preserving buildings, this home on Legare Street was built in 1772 and has been preserved beautifully for hundreds of years. A primary energy efficient feature of this classic single house is the south-facing piazzas that reduce solar load and help to channel the breeze.

YOU CAN HELP! Be mindful of what you buy and aware of its full life cycle carbon footprint.

OUR EMISSIONS REDUCTION GOALS

In 2017, Mayor Tecklenburg signed Climate Mayors coalition to accelerate climate progress in Charleston. In doing so, he pledged to demonstrate leadership on climate change and uphold the spirit of the Paris climate agreement by pursuing actions to achieve an 80% reduction in emission levels by 2050. Following more recent science based targets from the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5C and using the One Planet City Challenge calculation method, the 2021 Climate Action Plan expands our goal and establishes the following GHG emissions reduction targets for both City government operations and Charleston citywide:

- **Reduce emissions 56% below 2018 levels by 2030**
- **Reduce emissions to net zero by 2050**

Net zero means we add no more than we take away.

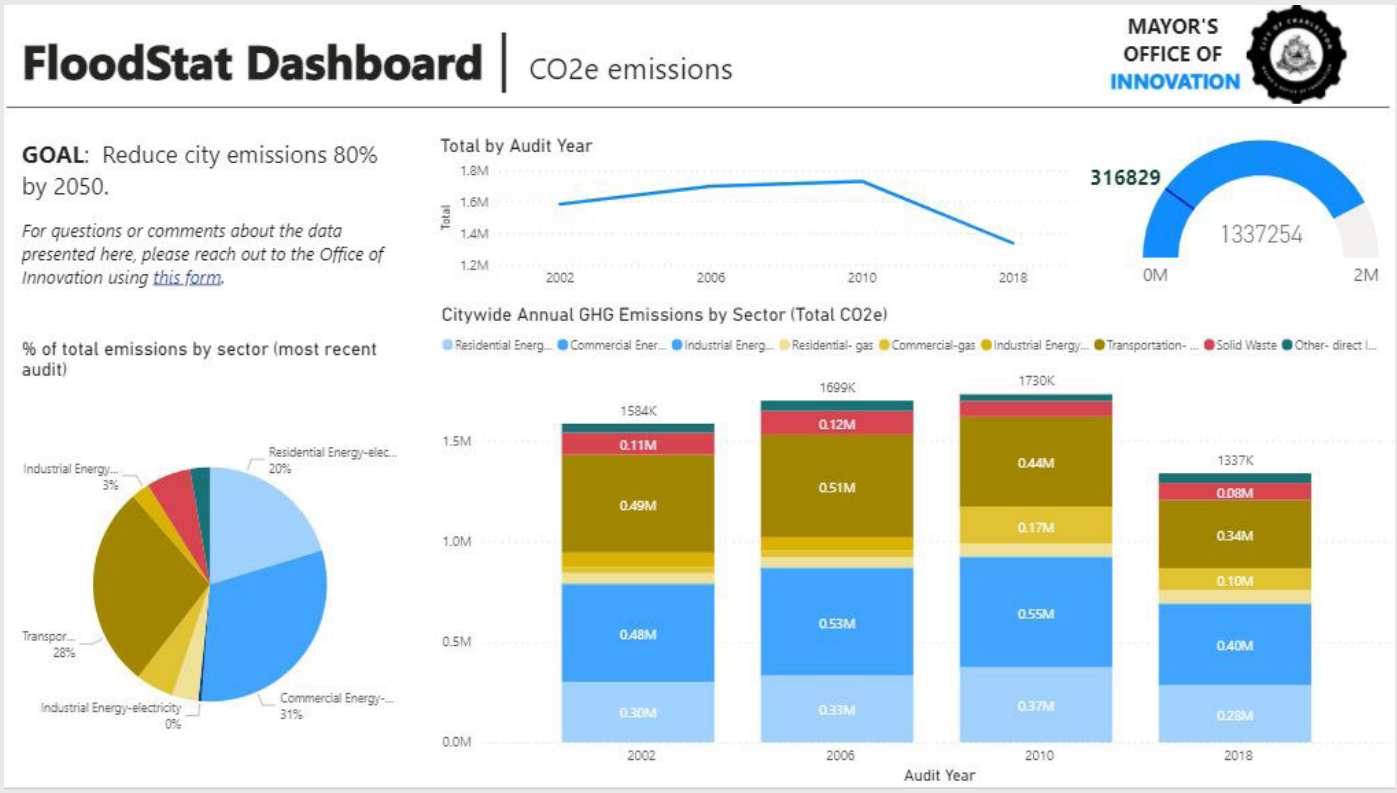
PROGRESS SPOTLIGHT

PRIORITYSTAT

The new Mayor's Office of Innovation has created a performance management tool called PriorityStat. The tool helps City staff track if our goals are being achieved, and also helps inform our residents to know the same.

The stat programs revolve around the Mayor's greatest priorities. With flooding being one of the Mayor's highest priorities, the first stat program created under the PriorityStat umbrella is FloodStat. It has the goal of protecting our City and citizens from the impact of flooding and sea level rise and has five different key performance indicators and many metrics. Carbon pollution is one of the many metrics tracked in FloodStat. **Use the FloodStat tool to track progress on our emission reduction goals.**

FloodStat meets the first Thursday of most months, rotating through departments based on the established reporting timeframe for their metrics. FloodStat meetings are open to the public. These meetings are designed to foster an environment of accountability and collaboration, and represent a strong partnership between the Mayor's Office and department leadership and their shared interest in using data to drive performance and decision-making.



Track our Progress! Visit www.charleston-sc.gov/climate-action

REACHING OUR EMISSIONS REDUCTION GOALS

As emissions are generated from throughout the community, everyone has a role to play in reducing them. Working together, we can achieve our ambitious carbon reduction goals and play an important role in mitigating climate change. To achieve Charleston's emissions reduction goals two main impacts need to occur:

1. This action plan needs to be implemented and it is imperative the entire Charleston community begins to re-imagine how we use energy, how we get to our destinations, and how we purchase and dispose of products. While this action plan outlines policies and programs that will help catalyze community action, **it is ultimately up to the people of Charleston to take action at individual, group and institutional levels.**

2. The success of Charleston's emissions reduction goals also highly depends on our **utilities' continual focus on phasing out fossil fuel energy sources and taking advantage of renewable energy opportunities**.

The emissions projections in Figure 4 below illustrate how the actions in this strategy add up to put us on a path to meet the 2030 reduction goal. As the Climate Action Plan is only a 5-year strategy, there is more work to do and we anticipate advances in technology, affordability, and climate mitigation policy to facilitate more progress toward achieving net zero emissions by 2050. It is also important to note this model doesn't account for carbon offsets, such as planting trees or the potential for utility scale carbon capture, which could benefit from further research.

The "business as usual" line in Figure 4 is the line depicting future emissions if this action plan were not implemented. It takes into account a population increase estimated to be 232,419 people by 2050 (City of Charleston Planning Department). It also takes into account the utilities' plans for reducing fossil fuels over time- it uses state utility source mix data for 2018 when 44% of the electrical mix was produced by coal and natural gas (both fossil fuels), and anticipates the utilities reducing the fossil fuel mix to 22% by 2050 with a reduction in coal but an increase in natural gas.

Forecasting emissions reductions in some areas is straightforward and in other areas is complex. For example, emissions from zero carbon activities are relatively simple to estimate than those from electric vehicle use or transit ridership. Most of the actions are interrelated and should be considered as a whole instead of a line-item list. Thus, instead of presenting each action as a specific amount of emissions impact, reductions are aggregated.

REPORTING ON IMPLEMENTATION PROGRESS

City staff will continue to advocate for improving data collection methodology through implementation and will report on climate action progress a few ways:

1. By continuing to update the FloodStat dashboard after an emissions inventory is performed to reflect progress on emissions reduction goals.

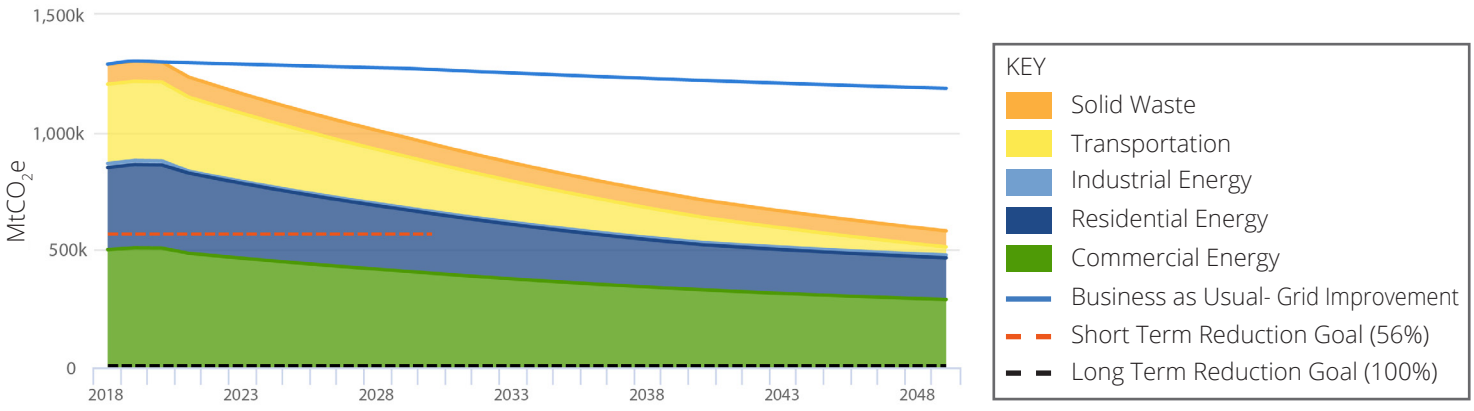
2. By keeping residents informed of the status of actions in this plan via our online implementation plan found at www.charleston-sc.gov/climate-action.

3. By producing an annual progress report for City Council and the public the end of each year.

STAFFING UP

To work on new projects and achieve goals faster, it will be helpful to consider expanding staff capacity. i.e. staff focused on pursuing renewable energy opportunities and staff focused on community engagement.

FIGURE 4: CHARLESTON CITYWIDE GHG EMISSION FORECAST



BENEFITS OF CLIMATE MEASURES

In addition to addressing climate change, measures taken to reduce greenhouse gas emissions produce a number of additional benefits for people and the economy of Charleston. Eleven major "co-benefits" were identified that are expected to arise from the suite of reduction strategies included in this plan.

FIGURE 6: CRITERIA TO DETERMINE THE CO-BENEFITS OF EACH ITEM

	Co-Benefits										
TOTAL Co-Benefits	Cost Savings	Economic Devel. & Retention	Improve Public Health i.e. air quality	Ecosystem Protection i.e. Water Quality	Improve Mobility	Safety	Enhance Climate Adaptation	Beautification	Historic Preservation	Cultural Preservation	Raise Awareness & Role Model
7	1	1	1	1		1	1				1

COST SAVINGS

The most obvious co-benefit is the potential for significant cost savings. Many of the measures in this plan pay for themselves by reducing costs to the City and its residents. Encouraging energy efficiency, water efficiency, and adoption of renewable energy will result in lower utility bills for residents an businesses. Promoting use of alternative transportation such as bicycling, walking, public transit, ride-sharing, and electric vehicles will lead to cost savings compared to fueling and maintaining a gasoline or diesel vehicle. City government can also enjoy substantial savings through increased efficiencies in buildings, facilities operations, and vehicle fleets.

ECONOMIC DEVELOPMENT & RETENTION

This action plan includes initiatives to support and incentivize locally held businesses, which will foster local economic development while reducing GHG emissions. The plan will enhance community vibrancy by promoting compact, mixed-use development and pedestrian- and bike-friendly neighborhoods. Initiatives to expand the City's tree canopy and greenspace will increase residential property values, viability of local businesses, and the City's appeal to outdoor recreationists. Renewable energy is a growing sector that can spur business and job growth during design, manufacture, and installation of measures, such as energy efficiency, renewable energy and sustainable construction.

PUBLIC HEALTH

Climate mitigation actions that reduce GHG emissions also reduce other air pollutants such as particulate matter, SO_2, NO_x, and ozone that are linked to asthma and other respiratory diseases, especially in children. This plan also increases opportunities for active lifestyles by promoting compact development and working to increase pedestrian/bicycle infrastructure. In addition, expanding urban tree canopy and greenspace can reduce stress, promote physical activity, and reduce rates of asthma, cardiac disease, and strokes from improved air quality. More trees will also help cool our city streets, reducing heat-related illnesses as our climate warms.

ECOSYSTEM PROTECTION

Globally, GHG mitigation helps to prevent negative impacts on ecosystems, including biodiversity loss, ocean acidification, soil degradation, water pollution, and the loss of ecosystem services. Many actions in the plan focus on protecting water quality and these support the health and viability of the Lowcountry's unique marshes and wetlands, which are major assets that absorb carbon and floodwaters. Waste reduction activities, particularly those focused on single-use plastic products, can help reduce the effects of harmful plastic pollution in our saltwater and freshwater ecosystems too.

CLIMATE ADAPTATION & RESILIENCE

Many climate mitigation actions also help enhance climate resilience to the impacts of climate change, such as flooding. For example, planting trees increases carbon sequestration while also protecting against flooding by absorbing stormwater. Rooftop solar energy installations, when paired with battery backup, can increase resilience by providing backup power in the aftermath of a hurricane. Protecting carbon sinks supports healthy wetlands and marshes which are important flood protection measures during king high tides and storm surges. While the City already has a climate adaptation plan focused on addressing the impacts of climate change and has completed a Vulnerability Assessment in 2020 to help identify measures to increase community resilience, it is important to note many actions in this plan also support adaptation.

MOBILITY

Getting from place to place easily is an important priority for many Charlestonians, and many of the initiatives in this plan actually help increase mobility in addition to their climate mitigation benefits. For example, improving traffic signal infrastructure and the timing of traffic lights reduces vehicle wait time at traffic lights. Concentrating development in compact centers with a mix of uses, services and housing, reduces long commute times and the number of cars on the road.

SAFETY

Many of the action items also support a safer Charleston. For example, improving intersection crossings, wayfinding and protected bike lanes helps make a safer experience for pedestrians and cyclists.

BEAUTIFICATION

The plan includes many initiatives that will also improve aesthetics and beautify Charleston. For example, planting more trees and improving tree protection requirements for developers.

HISTORIC & CULTURAL PRESERVATION

It is no secret that the people and places in Charleston help make our community unique. This action plan outlines various items that support preserving our historic and cultural assets. For example, creating design guidelines for renewable energy in the historic district not only increases opportunities for homeowners and businesses to produce their own clean energy, but also supports a consistent approach to design review to protect the cultural and historical integrity of our historic district. In addition, existing buildings are inherently the most sustainable buildings, because they are already built.

RAISE AWARENESS & ROLE MODEL

Often people want to learn more by viewing a demonstration project in the community before committing to taking individual action. This plan outlines numerous opportunities for community members and City government to help lead by example. For instance, as the City progresses with a Fleet Transition Plan, it may help Charlestonians become more aware of the potential for electric vehicles in their day-to-day lives.

Dedicated paths, like the West Ashley Greenway, provide opportunities for walking and cycling that reduce the number of vehicles on the road. This not only reduces emissions, but has economic benefits to the nearby businesses and improves overall safety and mobility in Charleston.

The historic Dock Street Theatre underwent energy efficiency improvements recently, reducing emissions while saving money and preserving cultural and historic character.

SOCIAL EQUITY

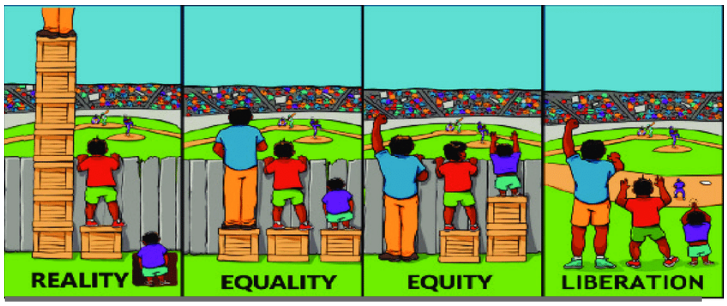
Social equity can also be a co-benefit and it should be a major consideration when creating a climate action plan. Research shows that vulnerable populations such as the elderly or chronically ill, people with lower incomes, and people of color are more at risk when it comes to experiencing impacts of climate change. These communities already experience institutional and systematic oppression that result in less access to resources, capital, and services. Climate change exacerbates these gaps. By targeting programs and making changes to services or infrastructure before extreme events happen, we can mitigate the most devastating impacts to already vulnerable populations.

Equity is when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential. We have a shared fate as individuals within a community and communities within society. All communities need the ability to shape their own present and future. Equity is both the means to healthy communities and an end that benefits us all.

Climate equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. This requires intentional policies and projects that simultaneously address the effects of and the systems that perpetuate both climate change and inequity. Government action alone is not enough to address climate change; everyone must be a part of the solution. Currently, however, not everyone has equitable opportunities to participate and benefit.

Communities of color and low-income populations have historically been underserved by programs and investments and underrepresented in decision making on climate policy. Lack of low-carbon, safe transportation options, inefficient housing and the inability to afford healthy food are examples of disparities experienced by these communities that result in fewer benefits from climate action opportunities. These inequities primarily result from ongoing institutional racial bias and historical discriminatory practices that have resulted in the inequitable distribution of resources and access to opportunities.

Climate change exacerbates health disparities and is a public health emergency, disproportionately harming



the most vulnerable among us – children and pregnant women, people with low income, the elderly, people with disabilities and chronic illnesses, and marginalized people of all races and ethnicities. The health threats of climate change include increased exposure to extreme heat, reduced air quality, more frequent and intense natural hazards, increased exposure to infectious diseases and aeroallergens, effects on mental health, and increased risk of population displacement and conflict.

Climate change is likely to amplify the impacts of these existing inequities. In addition, the many economic and health benefits of carbon reduction investments are not shared equitably across the City.

Equity is integrated in the following ways:

- The strategy was developed with a community working group, the Climate Action Plan Taskforce. It was made up of a diverse group of stakeholders from grassroots groups, business representatives, faith and spiritual communities, and neighborhoods. This group vetted all the action items with equity and climate justice in mind.
- Representatives from the City's Special Commission on Equity, Inclusion, and Racial Conciliation served on the Climate Action Plan Taskforce and vice versa. Some taskforce members also served on the Special Commission's subcommittee group called Health Disparities and Environmental Justice.
- Each of the action items in this plan was assessed and evaluated on whether they help to uplift climate equity and reduce disparities.
- Climate equity is included in the overall Climate Action Plan vision.

ASSESSMENT CRITERIA

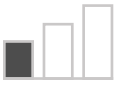
The Climate Action Plan Taskforce created assessment criteria for each subcommittee to evaluate their proposed action items. The assessment criteria used a stoplight approach weighted scale to help determine the priority of each draft action item and whether or not they should be included in the final draft.

Each strategy and action was created and reviewed by a group of stakeholders who considered the following criteria:

- Is the item within the City's authority?
- What is the GHG emissions reduction potential?
- Is it feasible from a cost perspective?
- Is it feasible from a staff capacity perspective?
- Is it feasible from a community and political support perspective?
- Does it provide multiple co-benefits?
- Can it reduce inequity?
- Does it benefit vulnerable communities?
- What is the timeframe to implement it?
- Is this a priority the community has been asking for?

GREENHOUSE GAS REDUCTION POTENTIAL

The potential for greenhouse gas reductions per action item were estimated to help evaluate the impact of each item as well as a priority.



Low GHG Reduction Potential

Medium GHG Reduction Potential

High GHG Reduction Potential

COST

An estimated cost of each item was considered to help evaluate and prioritize actions using the following scale:

$ = $0 - $10,000

$$ = $10,001 - $50,000

$$$ = $50,001 - $100,000

$$$$ > $100,000

PRIORITY

The subcommittees determined the overall priority in the action plan by analyzing the preliminary assessment criteria results. It was challenging determining priorities as all items play an important role towards achieving our goals. In the end, priorities were categorized as:

- Low priority
- Medium priority
- High priority

FIGURE 5: CRITERIA TO ASSESS DRAFT ACTION ITEMS

ASSESSMENT CRITERIA (3= "green light"; 2="yellow light"; 1="red light")										Rank
Is it within City authority?	**GHG Emissions Reduction Potential**	**Provides Co-Benefits**	**Equitability**	**Ability to Implement (Financial)**	**Ability to Implement (Political)**	**Ability to Implement (Staff Capacity)**	**Timeframe to Implement**	**Benefit to Vulnerable Communities**	**Community Priority**	**Priority in CAP**
3= full control, 2= advocate, 1= no control	3= high impact, 1= low or no impact	3= 3 or more other benefits, 1= no cobenefits	3= reducing inequity, 1= has adverse impacts	3= little to no $$, 1= large investment	3= City Council & community likely to support	3= staff easily handle, 1= new staff needed	3= short term, <1 year, 1= long term >3 years	3= multiple communities, 1= no communities	3= High priority, 1= Low or no priority	3= High priority, 1= Low priority
2	3	3	3	3	3	3	1	3	3	3

CHAPTER 1

BUILDINGS

PRIMARY TARGETS

- Reduce 117,080 $MtCO_2e$ from buildings by 2025.
- Increase square footage of buildings achieving certification program status, such as Charleston RISES
- Identify feasibility and funding opportunities for renewable energy on City buildings

OVERVIEW

This chapter focuses on programs, projects and policies to reduce emissions from energy use in buildings. Energy consumed in buildings accounts for 65% of Charleston's total GHG emissions.

Improving the efficiency of our existing building stock and reducing energy needs contribute significantly to achieving Charleston's goals. Once buildings have undergone energy efficiency improvements and the waste has been eliminated, then a next step is to evaluate renewable energy opportunities. It will also be important to transition so future construction of buildings operate on electricity, are not reliant on natural gas, and are compatible with our community's climate goals.

EQUITY CONSIDERATIONS

Often, families that can least afford high-cost utility bills live in homes that are not energy efficient. These households may lack the ability to prioritize or pay for energy efficiency improvements, or to access renewable energy options, particularly since both of these often require up front capital investment to benefit from long term savings. It is important to note that renters can also be at a disadvantage as they do not have the same ability to implement and gain the benefits as property owners.

It will be important to prioritize actions that mitigate issues related to affordability, such as communicating with low income homeowners who may qualify for no cost energy audit and weatherization programs, and expanding financial mechanisms for those low-middle income homeowners who may not qualify for free retrofits but might still need assistance securing up front funding.

EXPECTED BENEFITS BESIDES CARBON REDUCTION

1. Beautification
2. Cost savings
3. Cultural preservation
4. Economic development and retention
5. Ecosystem and water quality protection
6. Enhance climate adaptation
7. Historic preservation
8. Mobility improvement
9. Public health and air quality protection
10. Raise awareness and be a role model for others
11. Safety improvement

COMMUNICATION & EDUCATION OPPORTUNITIES

Opportunities for education campaigns to better involve the Charleston community in meeting our goals include:

- Encourage energy and water efficiency and conservation, include the promotion of existing energy audit and weatherization retrofit programs
- Lifestyle actions to support community use of renewable energy
- Create more awareness to designers of energy efficiency opportunities and sustainable construction methods and materials, such as passive solar

PARTNERS

The State of South Carolina will be an important partner in helping to create new equitable funding opportunities for low-middle income homeowners to retrofit and for new construction to be energy efficient from the beginning.

EXTERNAL FUNDING OPPORTUNITIES

- SC Energy Office ConserFund low interest loan
- SC Energy Office mini-grant

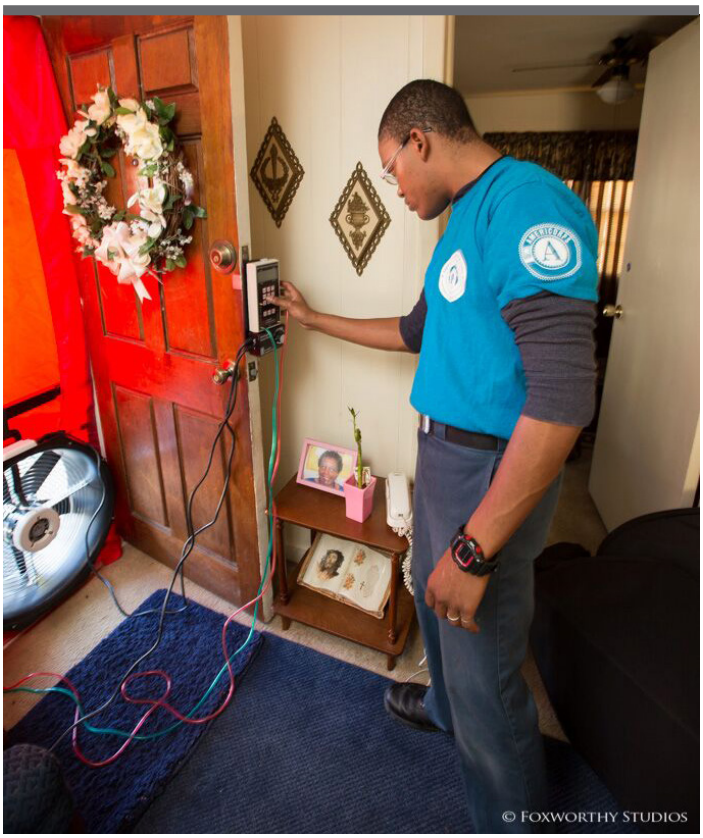
TABLE 1: BUILDINGS ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Increase energy efficiency and conservation				
B1	Support efforts to strengthen the energy code at the state level and advocate for state building policies that align with carbon neutrality by 2050 and other initiatives in the SC Energy Efficiency Roadmap		$	High
B2	Support state efforts and explore local equitable gap funding opportunities for energy efficiency in new construction and upgrades to existing construction		$	High
B3	Consider expanding incentives for sustainable construction and renewable energy via the zoning code, such as building certification programs like Charleston RISES		$	High
B4	Increase staff capacity and funding to conduct a facilities assessment plan and continue improving energy efficiency of existing City buildings, and to ensure new City buildings lead by example by being energy efficient and pursuing industry best practices that align with carbon neutrality by 2050		$$$$	High
B5	Create mechanical, electrical and plumbing standards that include energy efficiency for City facilities		$	Medium
B6	Consider creating stronger guidelines above minimum code for new City construction, include total cost of ownership standards and consideration of a tailored Charleston RISES certification		$$$$	Medium
B7	Assess feasibility of expanding staff capacity and training to strengthen enforcement of energy code compliance		$	Medium
B8	Consider developing or adopting alternative standards that expand allowable construction method options to include those which are inherently more energy efficient and sustainable, such as rammed earth		$	Medium
B9	Explore opportunities to restart the Green Business Challenge		$	Low
B10	Support state efforts for the disclosure of utility data by property sellers		$	Low

YOU CAN HELP! For ways to reduce your energy consumption and make your home more energy efficient visit www.charleston-sc.gov/2020/You-Can-Help

TABLE 1 (CONTINUED): BUILDINGS ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Promote and plan for renewable energy				
B11	Support renewable energy projects including community solar and other initiatives, such as those in the SC Energy Efficiency Roadmap		$	High
B12	Create design guidelines for renewable energy standards in the historic district		$	High
B13	Investigate the feasibility of renewable energy and battery storage opportunities for City facilities and plan for future funding opportunities		$$	Medium



An Energy Conservation Corps member performs testing to determine appropriate energy efficiency improvements to help reduce utility bills and wasted energy.

Solar panels were installed and energy efficiency upgrades were performed on this home on Reid Street through a grant the City and the Sustainability Institute partnered on.

YOU CAN HELP! If you are interested in installing solar on your home, do an initial assessment. Get the facts about how solar works and understand consumer information.

BUILDINGS

PROGRESS SPOTLIGHT

ENERGY EFFICIENCY IN CITY FACILITIES

Energy efficiency is a critical, yet often overlooked, component of a resilient energy system and an imperative first step to take before considering renewable energy opportunities. The City of Charleston has prioritized energy efficiency to ensure our buildings and facilities are performing as efficiently as possible and not wasting energy. These actions save money and reduce carbon emissions from building operation.

To jumpstart the effort, the City partnered with Johnson Controls International in an energy management performance contract in 2001. Through this effort and with leadership and support from the City Parks Department, which oversees facilities, the City is making improvements to reduce energy and water use throughout our 4.2 million square feet of building space and 1,806 acres of parks!

The improvements are saving millions of dollars, renewing aging inefficient infrastructure (through reinvestment of the savings), **and reducing lifetime emissions from City operations by over 180,000 tons of CO_2.**

Below are some energy efficiency project highlights. Some initiatives were part of the energy performance contract and others were performed independent of that project with leadership from the Facilities Division of the Parks Department.

- Install high efficiency LED fixtures with sensors in parking garages
- Install LED bulbs as lighting upgrades in City facilities
- Replace inefficient chillers, air handling units and HVAC units, particularly those reliant on R22 refrigerant as the product is phasing out and has major environmental concerns
- Install programmable thermostats at multiple locations
- Link the City's diverse and widespread facilities into one systemwide control dashboard
- Install VendingMiser® technology on cold beverage and snack machines throughout the City
- Renovate facilities, clean ducts, replace windows, and address any building envelope concerns
- Install new WeatherTrak irrigation system throughout
- Implement water conservation measures at City parks
- Renovate MLK pool enclosure

New LED lights at Joseph P. Riley, Jr. Ballpark.

FEATURED PROJECTS	TONS OF CO_2 SAVED ANNUALLY	KWH SAVED ANNUALLY	ONE-TIME UTILITY REBATE
Stadium lights at the Joseph P. Riley, Jr. Ballpark, Stoney Field, and Volvo Car Stadium were upgraded to LED	57	118,454	$74,060
Parking garages at Gaillard, Aquarium, Visitor's Center, Marion Square, Charleston Place, Concord, and Queen were upgraded with LED lights and sensors	293	607,796	$44,350
Aging HVAC Chiller equipment at Dock Street Theatre was replaced with energy efficient technology	29	60,817	$13,747

CHAPTER 2

TRANSPORTATION

PRIMARY TARGETS

- Reduce 73,142 $MtCO_2e$ from transportation by 2025.
- Increase publicly accessible electric vehicle charging infrastructure 100% by 2023.
- Reduce Vehicle Miles Traveled (VMTs) 4% by 2025.

OVERVIEW

This chapter focuses on programs, projects and policies to reduce emissions from transportation. The second largest emitter, transportation accounts for 25% of citywide emissions at 337,618 $MtCO_2e$.

Besides emitting greenhouse gases, transportation fossil fuels also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting our health. The more we walk, ride bikes and take public transit, the less emissions and air pollution there will be from vehicles. Charleston is a small city so public transit is focused on key dense corridors that have the population to support regular routes. That means residents and visitors need access to other opportunities to get around besides automobiles. One exciting new opportunity to travel will be on the new Lowcountry Rapid Transit, a state-of-the-art bus rapid transit system, learn more at lowcountryrapidtransit.com.

Mass adoption of autonomous vehicles will have impacts that are not yet clear. They could increase vehicle miles traveled and congestion, and they could improve mobility by eliminating the need to own and store a personal vehicle.

EQUITY CONSIDERATIONS

Some neighborhoods are not as well connected as others, which puts a strain on residents that need to travel longer to access public transit or bike paths. Better transportation options can improve health outcomes and economic opportunities for disconnected communities through reduced air pollution and greater access to regional jobs. A lot of equity considerations relate to public transit that our partners are focused on, such as consistency in access, gap services and affordable fares.

EXPECTED BENEFITS BESIDES CARBON REDUCTION

1. Beautification
2. Cost savings
3. Cultural preservation
4. Economic development and retention
5. Ecosystem and water quality protection
6. Enhance climate adaptation
7. Historic preservation
8. Mobility improvement
9. Public health and air quality protection
10. Raise awareness and be a role model for others
11. Safety improvement

COMMUNICATION & EDUCATION OPPORTUNITIES

Opportunities for education campaigns to better involve the Charleston community in meeting our goals include:

- Support community use of electric vehicles
- Advocate for multi-modal transportation and specifically humanize people traveling on bike, foot and transit with appropriate branding and messaging.

PARTNERS

The South Carolina Department of Transportation will be an important partner in helping to create safer opportunities to bicycle and walk around the City. The Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) and the Charleston Area Regional Transportation Authority (CARTA) are also key partners to advance public transit in the area as the City does not manage transit. The BCDCOG also plays an integral role to support bicycle and pedestrian planning in the region.

EXTERNAL FUNDING OPPORTUNITIES

- SC Energy Office ConserFund low interest loan
- Grants: SC Energy Office, DOE Advanced Vehicle Technologies, EPA Diesel Emissions Reduction Act, DOT Better Utilizing Investments to Leverage Development

TABLE 2: TRANSPORTATION ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Increase use of public transit systems				
T1	Require new large development projects located along existing or planned transit corridors to install bus stop shelters and transportation infrastructure like turnouts		$	High
STRATEGY: Increase employee commuter options				
T2	Explore opportunities with CARTA to create an employer transit program for part-time City staff riders, such as charging fees based on use		$$$$	Medium
T3	Review existing temporary City telecommuting policy and adopt permanent policy		$	High
STRATEGY: Embrace electric and other low or no emission motors				
T4	Expand publicly-accessible electric vehicle charging infrastructure, especially at ride share, mobility hubs, on-street peninsula access and City parking facilities		$$	High
T5	Create policy to require charging stations in new large commercial construction and consider EV ready requirements for smaller projects		$	High
T6	Create a plan to transition the City fleet and other small engines to alternative fuel vehicles, include vehicle replacement standards and charging infrastructure		$	Medium
T7	Consider options to phase in alternatives to gas powered small inefficient engines		$	Low
STRATEGY: Improve land use policy to reduce vehicle miles travelled				
T8	Concentrate development in compact, walkable centers that are well connected to public transit and offer a mix of uses, services and housing options		$	High
T9	Right-size parking codes including implementing parking maximums and explore opportunities to allow developers to pay into a parking in-lieu fund		$	High

TABLE 2 (CONTINUED): TRANSPORTATION ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Increase bicycle and pedestrian activity				
T10	Re-examine options for new bike share programs, including electric options, and expand bike share access to City employees		$	High
T11	Improve and expand bicycle and pedestrian facilities and infrastructure, such as intersection improvements, bicycle repair service stations and bicycle corridors identified in the People Pedal Plan		$$	Medium
T12	Establish temporary and permanent car free areas such as rethinking curb spaces		$$	High
T13	Transition existing Complete Streets resolution into ordinance prioritizing pedestrians at key crossings		$	High
T14	Expand consistent wayfinding signage to increase safety and the user experience		$$$	Medium
STRATEGY: Reduce idling				
T15	Explore creative options to enforce the City's existing anti-idling policy		$	Low
T16	Improve traffic signal infrastructure on the peninsula and synchronize signal timing to benefit all modes		$$$$	Low
T17	Encourage virtual community meetings or those located along transit routes and near stops, as possible		$	Low

PARTNERSHIP EFFORTS

- Support electric shorepower at a new cruise terminal
- Support the BCDCOG's efforts in exploring the use of zero-emission water transportation
- Explore opportunities with BCDCOG to provide gap services for first/last mile trips for residents not located on transit corridors such as park-and-rides and supporting vanpool and carpool programs
- Collaborate with partners to promote viability of electric vehicle rentals for visitors at the airport, local hotels, and tourist attractions


Photo credit: SC Energy Office

TRANSPORTATION

PROGRESS SPOTLIGHT

EXPANDING BICYCLE & PEDESTRIAN OPTIONS

Walking and biking produce zero emissions and help improve overall mobility by reducing vehicle miles traveled. In Charleston, our low-medium density forces us to acknowledge that most travelers still need a vehicle every now and then, but traveling by car is not the only way people in Charleston want to get around. A common request the City hears from residents is to expand opportunities to safely walk and cycle around our City. This is an important part of Charleston's multi-modal transportation system that aims to give residents and visitors convenient, efficient, and equitable mobility options. **Below are some exciting projects that aim to improve pedestrian and bicycle mobility and connectivity around Charleston.**

PEOPLE PEDAL PLAN

Charleston's vision for a robust urban bikeway system on the peninsula is outlined in the People Pedal Plan. It includes the most appropriate corridors for bicycle travel and where new investment should be allocated. The plan is the first comprehensive bicycle infrastructure study for downtown Charleston and was codified in the 2018 Citywide Transportation Plan as well as BCDCOG's Long Range Transportation Plan. For more information visit: designdivision.org/peoplepedal.

ASHLEY RIVER CROSSING

A FY2019 US Department of Transportation BUILD grant funded project, the Ashley River Crossing is a bicycle and pedestrian bridge that will connect West Ashley and Downtown Charleston. It is a key connection along the East Coast Greenway identified in the People Pedal Plan and it unlocks miles of existing and future multi-use and trail systems increasing access to jobs, schools, and other amenities for area residents and visitors. The FHWA, MUSC and SCDOT are amongst the many important project partners providing support from the beginning. For more information visit: ashleyrivercrossing.com.

BRIGADE STREET SAFETY IMPROVEMENTS

In partnership and coordination with an SCDOT resurfacing project, and in alignment with the People Pedal Plan, Charleston's first protected bike lane was born in March 2021. The safety and connectivity improvements are on Brigade Street between Huguenin and the old railroad tracks adjacent to I-26. Enhanced visibility for vulnerable road users has been emphasized in this project, chiefly through design elements including: a protected buffer between cyclists and motorists, curb extensions that shorten the pedestrian crossing distance, green paint in conflict zones like intersections, and solar-powered rapid flash beacons that signal the presence of pedestrians and cyclists to alert nearby motorists.

LOWCOUNTRY LOWLINE

The Lowline is a vision to reclaim 1.7 miles of abandoned railway track along the spine of the Charleston peninsula and transform it into a centralized regional community asset. The Friends of the Lowcountry Lowline are working alongside the City of Charleston to create a green space that highlights the surrounding neighborhoods, addresses citywide flooding, and gives pedestrians and bicyclists a safer, dedicated path. The Conceptual Master Plan was approved by City Council in December 2020 and the next steps are securing funding, design, community input, and construction. For more information visit: lowcountrylowline.org.

HOLY SPOKES BIKE SHARE

Charleston's first bike share system, Holy Spokes, launched in May 2017 and in its first five months had logged over 30,000 miles ridden, a number which exceeded planners' expectations. The program has recently expanded ridership options to include day passes and "just ride", a program to increase equitable access to dependent riders. The City will be reviewing opportunities to expand bike share as well as other micromobility options in 2021. To enroll today visit: charlestonbikeshare.com.

YOU CAN HELP! Before you jump in your car, consider alternatives to driving- like walking, biking or taking transit as able.

CHAPTER 3 | WASTE

PRIMARY TARGETS

- Reduce 1,935 $MtCO_2e$ from waste by 2025.
- Decrease tons of food waste going to the landfill
- Catalyze a society with a visionary goal to decrease the amount of waste reaching the landfill, ultimately to zero waste.

OVERVIEW

This chapter focuses on programs, projects and policies to reduce emissions from waste. Waste accounts for 6% of citywide emissions at 84,697 $MtCO_2e$. Life cycle emissions are not easily measured and are not included in this calculation, but do account for a large amount of emissions. These include production, and transportation of the product, see page 5 for more information.

By reducing the amount of organic materials, such as food, yard clippings, and cardboard, that reach the landfill, fewer methane emissions are released when the organic material decomposes. While recycling and composting help reduce the waste sent to the landfill, reducing waste at the source by purchasing and consuming less, will always be the most effective way to handle waste. Everyone has a part to play in a transition to a low-carbon materials economy: businesses can adopt clean and circular practices and consumers can use their purchasing power to demand the change they would like to see.

EQUITY CONSIDERATIONS

Frontline communities are disproportionately impacted by pollution from manufacturing and wasteful disposal practices, which includes nuisance issues of having landfills and incinerators located so close to residential neighborhoods- such as bad odors and potential health issues. Since composting programs are an extra cost in Charleston, this limits accessibility of the program hindering those with lower incomes from prioritizing this expense. Expanding the circular economy can have major cost saving benefits for frontline communities, such as expanding food recovery donation programs and strengthening the repair economy.

EXPECTED BENEFITS BESIDES CARBON REDUCTION

1. Beautification
2. Cost savings
3. Cultural preservation
4. Economic development and retention
5. Ecosystem and water quality protection
6. Enhance climate adaptation
7. Public health and air quality protection
8. Raise awareness and be a role model for others

COMMUNICATION & EDUCATION OPPORTUNITIES

Opportunities for education campaigns to better involve the Charleston community in meeting our goals include:

- Awareness of lifestyle actions to achieve zero waste. Include promotion of existing waste management programs such as Charleston County's recycling and composting programs, in addition to education and access information, such as creating a citywide zero waste app.

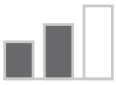
PARTNERS

The Lowcountry Food Bank and Stone Soup Collective could be helpful partners to advance edible food recovery and donation. Businesses that are built around the reuse and repair industry, such as the Sustainable Warehouse, the Charleston Library of Things, and Second Chance Bikes could be helpful to supporting reuse and repair goals. Keep Charleston Beautiful is a leader for waste education and will continue to be a key partner.

EXTERNAL FUNDING OPPORTUNITIES

- SC DHEC Solid Waste Grant

TABLE 3: WASTE ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Reduce waste and consumption				
W1	Continue supporting the elimination of single-use plastics		$	High
W2	Perform a garbage can audit and use the data to evaluate and restructure the way garbage and trash are collected to incentivize recycling and composting		$$$$	High
W3	Promote zero waste office practices for City staff to reduce, reuse and recycle and consider establishing sustainable procurement standards for City operations		$	Medium
W4	Strengthen partnerships to enhance edible food recovery and donation, such as Food Rescue US		$	Medium
W5	Support the reuse, repair, recovery and refurbishment economy, including for construction waste		$	Low
STRATEGY: Increase recycling and composting				
W6	Explore ways to create more opportunities for community wide composting, such as drop centers		$$	High
W7	Explore opportunities to make composting more available in City buildings, at City sponsored events such as Farmers Markets, and private events held on City property		$$	High
W8	Continue to add recycling bins next to garbage cans in public places and label them with consistent signage		$$	Low
W9	Support Charleston County's efforts to promote education for event and commercial recycling, and examine options to encourage businesses and events to recycle		$	Low
W10	Create a program to recycle mattresses		$$	Low

YOU CAN HELP! Reduce food waste and compost food scraps instead of sending them to the landfill.

Activities to help ensure a smooth community-wide transition away from single-use plastics included workshops for residents and businesses, reusable bag and straw giveaways, signage for businesses, and starter inventory for non-profit charitable organizations.

Track our Progress! Visit www.charleston-sc.gov/climate-action

WASTE

PROGRESS SPOTLIGHT

REDUCING SINGLE-USE PLASTICS

Single-use plastics trash our neighborhoods and waterways, threaten wildlife, and pose risks to human health. In addition, plastic contributes to greenhouse gas emissions at every stage of its life cycle, from its production to its refining, to the transport of it, and to the way it is managed as a waste product. For example, plastics are created by extracting fossil fuels from the earth. Also, growing research shows when single use plastics are exposed to the elements, particularly sunlight, they can release methane and ethylene- two powerful greenhouse gases.

As of January 1, 2020, operations throughout the City of Charleston are now required to eliminate use of single-use plastic carryout and merchandise bags, as well as certain plastic carryout and food packaging items. The ordinance was originally approved in November 2018 after three years of robust community discussion.

Following wishes of City Council, **grant funding was secured to help support a community-wide transition program** to move Charleston away from single-use plastics that can't be recycled or composted.

The grant was a great success with the following actions:

- 6,500 reusable bags given to community members (insulated, cotton and foldaway) and 1,000 reusable straws with cleaner
- 1,000 tabletop signs given to businesses for cashier area, 50 large poster signs, 300 small poster signs
- Over 30 non-profit charitable organizations that serve meals or other food products to those in need were given environmentally friendly plates, cups, clamshells and reusable bags. Most of these organizations previously used polystyrene products or plastic bags due to budget constraints and were thrilled to obtain starter inventory to transition to more environmentally friendly products.
- Over 50 businesses participated in our business workshops which helped folks learn details of the new plastic regulations, recycling information, and provided resources and samples of alternative products.
- Over 70 people participated in our workshops designed for residents. We shared the new plastic regulations and how to recycle right, while also giving away reusable bags and straws.
- Partnered with large grocery stores, exhibited at large events and gave away education materials and reusable bags and straws to the community at over 10 different locations, reaching thousands of residents.

MEASURING PROGRESS

Litter sweep data shows positive accomplishments despite fewer sweeps than usual last year due to COVID-19. Prior to the ordinance and grant project, Charleston Surfrider volunteers found an average of 178 single use plastic bags during a litter clean up. After the code and grant project, that number was down to 23!

I ♥ CHARLESTON

SHOP WITH REUSABLE BAGS

YOU CAN HELP! For ways to reduce disposable plastic in your life visit www.charleston-sc.gov/2020/You-Can-Help

CHAPTER 4 | CARBON SINKS

PRIMARY TARGETS

- Sequester 112 $MtCO_2e$ from tree plantings by 2025.
- Plant approximately 1,500 trees on public property including rights of way, parks, and other City facilities
- Increase tree plantings on private property

OVERVIEW

What is a carbon sink? Quite simply, reservoirs that absorb more carbon dioxide from the atmosphere than they release. This chapter focuses on programs, projects and policies that help pull carbon dioxide out of the atmosphere to sequester and store it. Carbon removal is an important element of a net zero emissions goal to capture surplus carbon in the atmosphere which cannot be done by reducing emissions alone. A mature tree, depending on size and species, can sequester up to 133 pounds of CO_2 annually. (Source: US Forest Service)

Carbon sinks already exist in nature, are abundant in the Lowcountry, and need protection. The ocean is an exceptionally large carbon sink comprised of many aquatic organisms, algae, coral and calcium carbonate shells. Other examples include our marshes, wetlands, forests, plants and the soil among them. Managing and protecting the health our natural carbon sinks is key, especially since these can become carbon sources releasing their trapped carbon into the air. For example, dead phytoplankton, potentially from poor water quality, becomes a carbon source when it sinks to the ocean floor. As the City does not operate any landfills, methane capture was not explored.

EQUITY CONSIDERATIONS

Protecting and expanding carbon sinks can also address inequities in historic resource allocation, especially access to open space, nature and tree canopy. For example, trees infiltrate floodwaters, reduce the urban heat island effect, and improve mental health (amongst many other benefits), yet they are not evenly distributed around all of Charleston. To address existing inequities, Charleston must prioritize protecting the trees it already has, while also increasing investment in tree plantings in frontline communities with lower canopy coverage.

EXPECTED BENEFITS BESIDES CARBON REDUCTION

1. Beautification
2. Cost savings
3. Cultural preservation
4. Economic development and retention
5. Ecosystem and water quality protection
6. Enhance climate adaptation
7. Public health and air quality protection
8. Raise awareness and be a role model for others
9. Safety improvement

COMMUNICATION & EDUCATION OPPORTUNITIES

Opportunities for education campaigns to better involve the Charleston community in meeting our goals include:

- Advocate for private tree plantings including how to properly care for a tree, and the programs and resources that exist to support planting more trees.
- Support partner programs that protect our saltwater ecosystems as major carbon sinks, such as community-based marsh restoration programs like SC Oyster Restoration and From Seeds to Shoreline.
- Encourage the power of native plant landscaping, which can require less maintenance and resources.

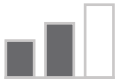
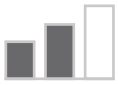
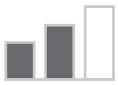
PARTNERS

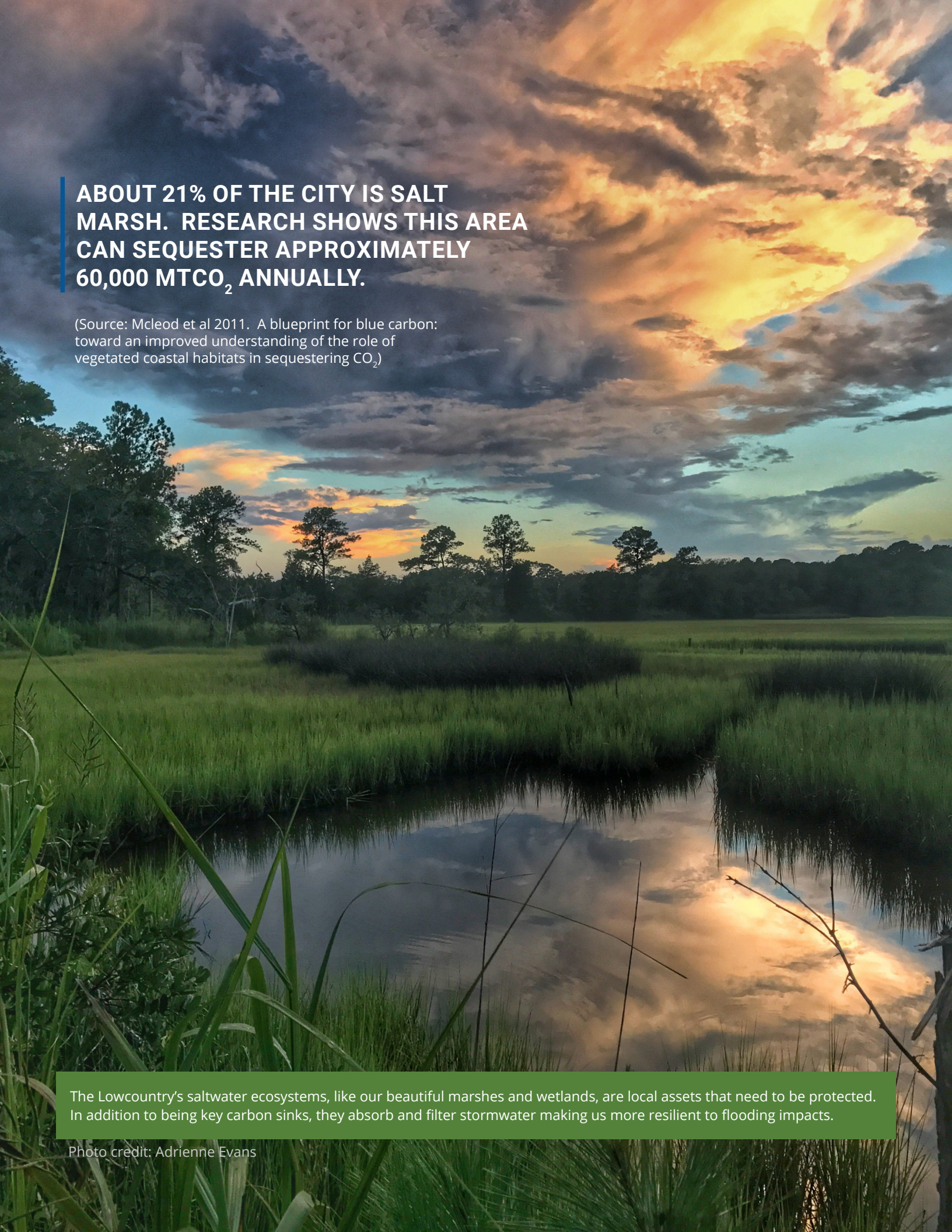
Many organizations exist in Charleston that work on protecting our carbon sinks and could help the City achieve this goal. SC DNR and SC Sea Grant manage the community- based restoration programs. Charleston Parks Conservancy, the Nature Conservancy, local plant clubs such as Charleston Horticultural Society and more, could also help.

EXTERNAL FUNDING OPPORTUNITIES

- Grants: NFWF National Coastal Resilience Fund, FEMA Building Resilient Infrastructure Communities, NRCS Conservation Reserve Program, EPA, National League of Cities, Gaylord and Dorothy Donnelley Foundation

TABLE 4: CARBON SINKS ACTION PLAN

ID	ACTIONS	EMISSIONS REDUCTION POTENTIAL	COST	PRIORITY
STRATEGY: Protect and promote natural ecosystems				
C1	Collaborate with regional and state partners to increase preservation and restoration of saltwater ecosystems like our marshes and wetlands as these are key carbon sequestering assets		$	High
C2	Continue with opportunities to acquire flood damaged properties and convert the land use to natural conditions that capture carbon and water		$$$$	High
C3	Examine land use policy to make room for existing marshes to migrate, such as adjusting zoning and developing more stringent marsh buffers		$	High
C4	Continue to expand Charleston Rainproof and Adopt a Drain programs as ways to protect water quality and health of blue carbon		$	Medium
C5	Pilot the application of super sink plants in appropriate public spaces, such as non-invasive native bamboo, and adapt practices to be pollinator friendly		$	Low
STRATEGY: Plant and protect tree canopy				
C6	Plant and prioritize tree plantings in areas that need it most, such as underserved communities with less overall canopy and communities with aging inventory		$$	High
C7	Consider strengthening tree protection regulations in zoning per recommendations in the Trees to Offset Stormwater project report		$	High
C8	Encourage tree plantings on private property		$	Medium
C9	Continue the City's Street Tree Program planting trees in the ROW in partnership with residents		$	Medium
C10	Perform street tree inventory and use data to guide funding to maintain existing canopy and seek opportunities to grow canopy and diversify species		$$$$	Medium
C11	Explore partnerships to create an urban forestry workforce training program with local school programs, such as Trident Tech horticulture program		$	Medium



ABOUT 21% OF THE CITY IS SALT MARSH. RESEARCH SHOWS THIS AREA CAN SEQUESTER APPROXIMATELY 60,000 MTCO$_2$ ANNUALLY.

(Source: Mcleod et al 2011. A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO_2)

The Lowcountry's saltwater ecosystems, like our beautiful marshes and wetlands, are local assets that need to be protected. In addition to being key carbon sinks, they absorb and filter stormwater making us more resilient to flooding impacts.

Photo credit: Adrienne Evans

CARBON SINKS

PROGRESS SPOTLIGHT

CHARLESTON RAINPROOF

Charleston Rainproof is a new program formed in fall 2019 that draws inspiration from Amsterdam Rainproof. It is also a recommendation from the Dutch Dialogues.

Charleston Rainproof is about us, the whole community- working together towards a common goal of addressing increasingly frequent and heavy rainfall.

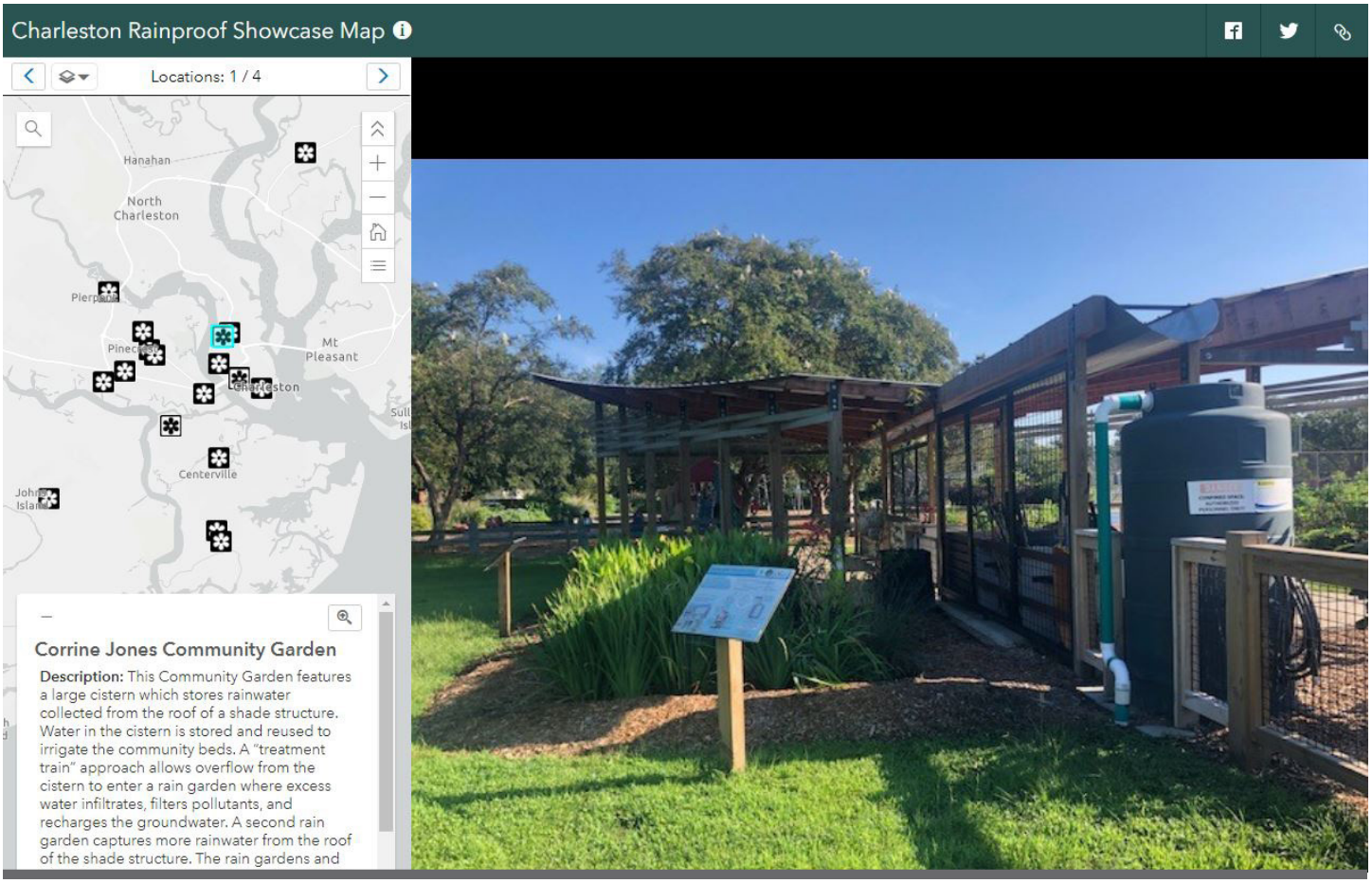
The concept is simple: utilize both public and private spaces to capture rainwater. Examples of projects include rain gardens and rain barrels, using permeable paving, and planting trees.

We often think of these programs in an adaptation scenario as they help build resilience and reduce the impacts of flooding, but recent studies have shown they have powerful carbon sequestration attributes too.

Rain gardens sequester carbon through their plants and store carbon in their plants and soil. The roots in the soil of a planted garden also prevent erosion, that conservation of soil also holds more carbon preventing soil disturbances which could release carbon. Not to mention, the plants in a rain garden can help filter out pollutants, this protects our water quality and helps to maintain the health our natural carbon sink ecosystems like our marshes and wetlands, and ultimately the ocean.

YOU CAN HELP! Consider adding a rain garden or planting a tree at your home!

You may add any Rainproof projects to the new Rainproof Showcase Map by visiting www.charleston-sc.gov/Rainproof



The showcase map is interactive allowing users to learn from others and locate public demonstration Rainproof projects to visit.

C | YOU CAN HELP

You can help be part of the solution by taking action at home and work. Some options are outlined on the next page. Please pay particular attention to the high impact actions, a few are highlighted below. Together we can make smarter and more sustainable living choices to help Charleston achieve our goals.

Help protect our critical saltwater ecosystems by participating in existing community-based marsh restoration programs. For example, SC Oyster Restoration schedules regular marsh grass seed planting and oyster clean up events. From Seeds to Shoreline engages K-12 schools in cultivating and transplanting young seedlings of salt marsh grass in a year-long marsh restoration and student learning process.

By shopping for produce locally, adding more vegetables in your diet, and composting food scraps, you can help reduce emissions from the transportation and production of food. Studies show plant-rich diets that reduce meat consumption not only use fewer resources but tend to be healthier too, which can lead to lower rates of chronic disease.

If you are able to utilize alternative modes of transportation to get places- such as biking, walking or taking transit, small trips can really add up to reduce emissions drastically. In addition, walking and biking provide light exercise and can improve your health too. Plan ahead for the new Lowcountry Rapid Transit system, it is South Carolina's first mass transit system and will connect Summerville with downtown Charleston.

Performing energy efficiency improvements around your home is a great way to save money on your utility bill. In addition, this reduces your carbon footprint because you need less energy to achieve the same outcome. For example, running the air conditioner requires less energy (and costs less money) after you perform insulation and caulking improvements to seal holes. Use the SC Energy Saver Tool to determine options available. If you meet income thresholds, you may qualify for FREE weatherization assistance from the Energy Conservation Corps and Palmetto CAP.

TAKE CLIMATE ACTION TODAY, CHARLESTON

CREATING A MORE RESILIENT AND SUSTAINABLE FUTURE.

A CHECKLIST FOR CLIMATE ACTION AROUND YOUR HOME

You can make a difference by taking action in your home with small changes. Here are some suggestions of how you can help right now. The actions with the highest impact are marked .

SUSTAIN YOUR LIFESTYLE

- ☐ Consume foods which are grown locally and/ or are grown organically. Join a farm share and shop at farmers' markets. Plant fruits and vegetables in your own garden or participate in a community garden. Eat at restaurants that feature local and seasonal foods, including seafood.
- ☐ Eat a plant rich diet. Reduce your consumption of meat and dairy. Try "meatless Mondays". Avoid food waste.
- ☐ Buy local products.
- ☐ Support environmentally-conscious businesses.
- ☐ Communicate with your elected officials regarding new and emerging solutions. Attend the City's Resiliency and Sustainability Advisory Committee public meetings.

PROTECT YOUR AIR, WATER AND CARBON SINKS

- ☐ Plant trees, especially where they'll provide shade for your house, and native plants for their resilience.
- ☐ Reduce pesticide and fertilizer use. Enrich your soil with compost. Purchase compost made locally.
- ☐ Properly dispose of waste including pet waste. It should not go down the storm drain.
- ☐ Participate in marsh restoration programs like SC Oyster Restoration and From Seeds to Shoreline (at school).

REDUCE YOUR WASTE

- ☐ Buy only items that are necessary and that you are sure you will use. Focus on enduring purchases instead of disposable items.
- ☐ Avoid single-serving packaging, especially plastic. Buy in bulk with reusable bags or jars.
- ☐ Compost your organic (food, yard) waste.
- ☐ Take your own reusable bags to the store.
- ☐ Donate unused clothes and electronics to charity.
- ☐ Opt-in for electronic catalogs and billing statements. Try these 4 tips to stop junk mail.
- ☐ Use extra paper as scrap paper and print double sided.
- ☐ Recycle. Find out what can be recycled. View Charleston County's recycling pick up schedule.

MAKE YOUR HOME MORE RESILIENT

- ☐ Adopt a storm drain to help maximize the amount of water that can flow into drains and protect water quality.
- ☐ Connect a rain barrel to your gutter system.
- ☐ Rainproof your home and install a rain garden, native plants, a green roof, or permeable pavement.
- ☐ Establish a household emergency plan and kit for storms, heat emergencies and other disasters.

LIGHTEN YOUR TRANSPORTATION FOOTPRINT

- ☐ Reduce single-destination and single-occupant trips.
- ☐ Walk, ride a bike, use public transit, or carpool. Use tools like Lowcountry Go, or plan your CARTA route online or in the easy Transit app.
- ☐ Use the most efficient vehicle when feasible.
- ☐ Avoid idling your vehicle, such as in the carpool pick up.
- ☐ Ride in a more efficient or alternative fuel car, such as a hybrid or electric vehicle.

USE ENERGY EFFICIENTLY AND RENEWABLY

- ☐ Get a free energy assessment from Dominion or Berkeley Electric. Or use the SC Energy Saver Tool.
- ☐ Perform energy efficiency improvements, like insulation. Utilize free weatherization programs (if income qualified) such as Energy Conservation Corps and Palmetto CAP.
- ☐ Consider installing solar on your home. Do an initial assessment. Get the facts about how solar works and understand consumer information.
- ☐ Use CFL and LED bulbs, they save energy and last longer.
- ☐ Unplug electronics and turn off lights. Use power strips.
- ☐ Adjust your thermostat to save while asleep or away from home. Install a programmable thermostat.
- ☐ Replace refrigerators and other appliances with those labeled ENERGY STAR®.
- ☐ Only run the dishwasher, dryer and washer when full.
- ☐ Wash clothes in cold water and hang out to dry.
- ☐ Take shorter showers. Install a low-flow showerhead.