



Draft Climate Action and Response Plan

November 16, 2020

What is the purpose of this plan?

This plan charts a course for how our community can work together to reduce the emissions that cause climate change and build resilience to the stressors that come from a changing climate.

How often will the plan be updated?

Our goal is to update this plan every five years. This approach will help us take advantage of new and evolving information, technology, and resources, while also allowing us to adapt to the latest science and local impacts. We see this plan as the first of several five-year plans that will advance climate action in Chapel Hill while looking out to 2050 and beyond.

How can I provide input?

Please share input through our [online feedback tool](#). This same information, along with additional supporting documentation, can be found on our website sustainchapelhill.org. You can also reach out directly to project staff, whose contact information is listed below. Please submit your feedback by Dec. 18, 2020 at 11:59 pm.

Correction

We have a correction for the emissions data presented to Council on [October 21, 2020](#). Due to a query raised after the meeting, we were able to determine that our 2017 community estimate did not capture all emissions from UNC-Chapel Hill. This error relates to the information shown within the [Staff Presentation](#) on slides 6, 8-10, and 13-17, and has been corrected within the draft plan on pages 4, 11, 13, 14, 20, and 26. These revisions demonstrate that community level emissions were 11% below 2005 levels in 2017. After accounting for these revisions, we now project that community level emissions will be 21% lower than 2005 levels by 2025, 33% lower by 2030, 57% lower by 2040 and 79% lower by 2050. These projections are based on the assumptions that the actions presented in the draft plan are implemented, including those taken by UNC as part of its commitment to reaching carbon neutrality.

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2020



DRAFT Town of Chapel Hill Climate Action and Response Plan



SUSTAINABILITY
Climate Action Plan

Acknowledgments

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CHAPEL HILL COMMUNITY

Thanks to the Chapel Hill community for your insight and support of the Chapel Hill Climate Action Plan and making Chapel Hill a stronger and more resilient community

TAKING ACTION TOGETHER SUMMIT COMMUNITY PARTNERS

A special thanks to our Community Partners—the businesses, development community, educational, finance, local, state and federal, agencies; neighborhood, environmental, and social justice organizations—who participated in the “Taking Action Together Summit.”

CONSULTANT TEAM



Planning
Communities



Contents

Plan Introduction	2
Mitigation and Resilience	5
Goals	8
Challenges and Opportunities	9
GHG Inventory Summaries	11
Town Government	
Community	
GHG Projections	14
Business as Usual	
With Actions	
Community Engagement	20
Community Benefits	22
Climate Actions	23
Top Actions	
Action summary table	
Actions by sector	
Buildings and Energy	
Transportation and Land Use	
Waste, Water, and Other	
Resiliency	
Implementation and Next Steps	66

Town of Chapel Hill Climate Action and Response Plan

The Town of Chapel Hill's community goals include creating a vibrant and inclusive community while being conscious of environmental stewardship. Reaching these goals means that the Town must prepare the community for the future by creating resiliency and sustainability.

Since 2006, when it committed to reduce its own carbon dioxide emissions by 2050, the Town of Chapel Hill has maintained its strong commitment to reducing its contribution to climate change. The Town is also committed to improving community resilience to better prepare for the effects of ongoing climate change.

In September 2019, the Town Council passed a resolution to create a Climate Action and Response Plan by 2020 and to put the Town on a path to 100% renewable energy by 2050. This Climate Action and Response Plan describes climate goals, challenges and opportunities, as well as the highest impact actions the Town and community can take together to reduce greenhouse gas emissions and respond to the effects of climate change.

The plan presents the top actions the Town and the Chapel Hill community can begin taking over the next five years to lower carbon emissions and address the effects of climate change.



Climate Change and Extreme Weather

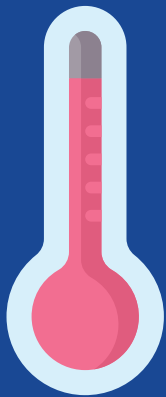
Climate change refers to long-term changes to weather patterns, such as a place becoming generally hotter, colder, drier, or wetter over time. In recent decades, climate change has occurred at an unprecedented rate primarily due to greenhouse gas emissions from human activity. This human impact on the environment is evident in the increasingly unpredictable and destructive weather patterns that negatively affect our community. **This Climate Action and Response Plan will help our community face these climate changes and challenges.**

WHAT ARE GREENHOUSE GASES?

Greenhouse gases (GHGs) are gases in the earth's atmosphere that trap heat and warm the planet. GHGs include carbon dioxide, methane, nitrous oxide, and fluorinated gases. The right proportion of GHGs keep our planet warm enough to support life. When there are too many GHGs in our atmosphere, too much heat is trapped and overall temperature rises.

Human activity such as burning fossil fuels has caused a dramatic increase in these gases since around 1900, and the trend has rapidly accelerated in recent years.

HISTORIC WEATHER TRENDS FOR NORTH CAROLINA



Temperature

2009-2018 warmest 10-year period on record for NC

2019 warmest year on record for NC

2010-2018 had the greatest number of nights >75° on record for NC

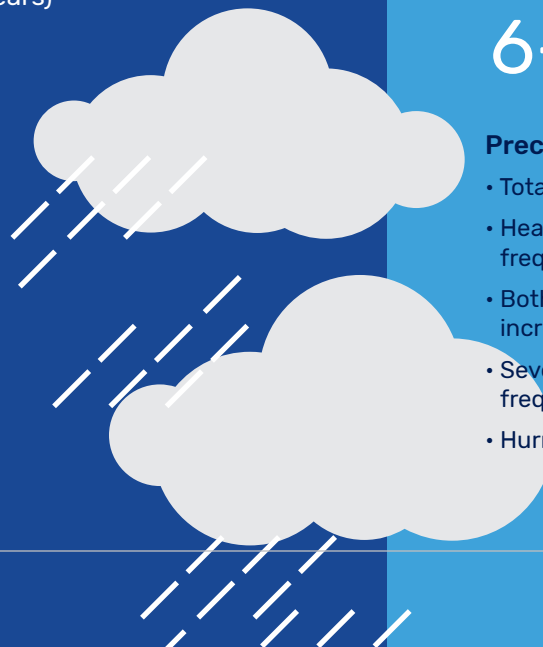
Winter temperatures above average since 1990 (30 years)

Precipitation and Storms

2015-2018 had the greatest number of heavy rain events (days with 3 inches or more) since 1900.

2016 - Hurricane Matthew - 10-18 inches of rain over 3 days

2018 - Hurricane Florence - 20-36 inches of rain in the most intense rainfall event on record



PROJECTED CHANGES IN REGIONAL TEMPERATURES AND PRECIPITATION BY 2050

Temperature Increase

2-5°F (NC)

Increase in the Number of Days >95°

15-25 or more days per year (Piedmont Region)

Increase in the Number of Nights >75°

6-35 or more days per year (Piedmont Region)

Precipitation and Storms

- Total annual precipitation will increase
- Heavy rain events will become more frequent and more intense
- Both coastal and inland flooding will increase
- Severe thunderstorms will become more frequent
- Hurricanes will be more intense and wetter

High Impact Actions

Top 5 Emissions Reduction Categories

The following is a list of the top action categories to reduce our community carbon footprint by 2050. These measures are projected to reduce community emissions by approximately 60% below 2005 levels. In cooperation with UNC’s carbon reduction plans, the total reduction in community emissions would be nearly 80%. We are focused on the most impactful actions we can take today, while also continuing to plan for the remaining 20% of emissions as we update this strategy every 5 years. Our new long-term goal is to produce zero net emissions by 2050. Specific actions are highlighted below and detailed later in the plan, including key resiliency measures for **green infrastructure** and environmental protection.

1. Greening the grid ▼29-30%



ACTIONS

- Advocacy
- Community renewable energy

TARGETS

- Utilities: net zero emissions by 2050

2. Sustainable development ▼10-11%



ACTIONS

- Green building policy
- Plan for walkable, transit-served neighborhoods

TARGETS

- 100% net zero emission development by 2030
- More walkable, transit-served areas by 2050

3. Electric vehicles ▼8-9%



ACTIONS

- Deploy EV charging network
- Electrify Town fleet

TARGETS

- Level 2 chargers: 629 public, 761 private +
- Level 3 charger: 99 public by 2050
- Electrify 48 Town passenger + light duty vehicles by 2040

4. Green building retrofits ▼6-7%



ACTIONS

- Upgrade existing buildings
- Upgrade Town facilities

TARGETS

- Convert 20k buildings to all-electric by 2050
- Halfway to net zero by 2050: 15% commercial, 30% residential, 100% Town

5. Sustainable Transportation ▼3-4%



ACTIONS

- Bus rapid transit (BRT) + electric buses
- Mobility Plan build-out

TARGETS

- Implement North-South BRT by 2040
- Implement Mobility Plan by 2035 + achieve 33% walk-bike-bus travel by 2050

Mitigation and Resilience

The Climate Action and Response Plan includes strategies the Town and community can take to reduce or “mitigate” greenhouse gas emissions and respond to the effects of climate change by making our community more resilient.



What is Mitigation?

Mitigation and resilience strategies work together to achieve climate goals. They are a form of long-term adaptation (or resilience). Mitigation strategies seek to:

- Reduce or eliminate GHG emissions
- Remove GHGs from the atmosphere through carbon sequestration or other measures

What can I do to make a difference?

You don't have to work for the Town or represent a partner organization to make a difference. Everyone can contribute by making a few greener choices. If everyone takes a small action, it can make a big impact! Here are a few simple ways you can help:

- Walk, bike, ride a bus, or go car-free
- Switch to a more efficient car or electric vehicle
- Use reusable products, like water bottles, cloth napkins, or soap dispensers
- Compost
- Choose products with less packaging
- Eat a more plant-based and local diet
- Adjust your thermostat to use less energy and save money

What makes a Resilient Community?

Climate resilience is the capacity of communities to reduce or avoid impacts from potential climate changes and stresses, recover quickly or “bounce back”, and even improve community environmental, social, physical, and economic well-being in order to “bounce forward.”

Resilience or adaptation strategies focus on how we prepare for and respond to the changes that are already happening in our climate.

Resilience strategies may include:

- Planning for severe weather and catastrophic events
- Developing early warning systems
- Providing resources for at-risk populations vulnerable to climate change impacts
- Protecting open spaces
- Improving water quality and stormwater management
- Developing partnerships
- Supporting environmental and climate education
- Expanding economic opportunity

Working Towards a Sustainable, Resilient Chapel Hill

Chapel Hill has been working to become a more sustainable and resilient community. This involves finding a strong and lasting balance between social, economic and environmental sustainability for our community. We strive to learn from our actions, monitor our progress, and innovate to solve problems.

Past Commitments and Targets

The **Town of Chapel Hill was among the first municipalities in the U.S. to commit to reducing its own carbon dioxide emissions by 2050 from 2005 levels.**


In 2017, the **Town committed to 26-28% carbon reduction from 2005 levels by 2025** to meet the United Nations Paris Agreement.

What is a sustainable and resilient, and equitable community?

- It's about asking, Who is supported by our actions and who is burdened or left out?
- It's where we protect and grow today's opportunities for tomorrow's generation.
- It's about being "future friendly".
- It means decisions and actions that leave Chapel Hill better than we found it.
- It's about preparation so we can bounce back from sudden change.
- We believe a sustainable and resilient Chapel Hill is the work of everyone who lives, works, visits, and goes to school here.



In 2016, the United Nations Paris Agreement called all nations to combat climate change and adapt to its effects. Participating nations and communities are committed to limiting the temperature increase this century below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit the increase to just 1.5 degrees.



What has Chapel Hill done so far to address climate change and become more sustainable and resilient?

- Participated in Triangle Regional Resilience Assessment
- Energy upgrades in Town facilities
- Green Building Ordinance
- Energy savings with rezonings
- Northside Energy Saver Program
- LED lighting upgrades
- Fare free transit
- Mobility Plan
- Green municipal fleet
- Electric vehicle charging stations
- Trails and greenways
- Commute Alternative Program
- Drive-thru Ordinance
- Stormwater management
- Water conservation with Orange Water and Sewer Authority
- Subwatershed studies
- Illicit Discharge Ordinance
- Jordan Lake Rules
- Explore More at Pritchard Park
- Smart City projects
- Solar on town buildings
- SolSmart
- Renewable energy evaluation
- Tree Planting Program
- Open space protection
- Coal ash remediation
- Recycling
- Composting pilot
- Green purchasing



Chapel Hill Climate Goals

The Town of Chapel Hill is committed to reducing Greenhouse Gas (GHG) emissions at the Community-wide level and for Town operations.

Town & Community Goals

40-50%

reduction by 2030

net-zero

by 2050

80%

clean, renewable energy by 2030

100%

clean, renewable energy by 2050

Governor Roy Cooper issued an executive order in support of the Paris Agreement in 2018. The order commits to reducing statewide GHG emissions to 40% below 2005 levels by 2025.

What is clean, renewable energy?

Renewable energy is derived from natural processes that are regenerative over short periods of time or cannot be depleted such as geothermal or solar. Clean energy comes from renewable energy sources that do not generate emissions.

What is net zero?

Net zero means achieving a balance between emissions produced and emissions taken out of the atmosphere. Another term for net zero is "carbon neutral". Net zero relies on improved efficiency to greatly reduce energy needs until they can be met by renewable energy sources.

Challenges and Opportunities

Addressing climate change will not be easy. There are economic, societal, and technological challenges that must be overcome to make significant progress. However, there are significant opportunities available too. Our community can expect our climate actions to result in many shared benefits that go beyond climate, like improved racial equity, public health and resilience. Challenges and opportunities with implementing climate action were identified through working sessions with Town staff, the climate action opinion survey, advisory board and commission review, and the Community Partners Climate Action Summit.



Challenges

Regional growth pressures

Continuing climate change brings new challenges

Lack of understanding of climate change and resilience issues

Climate burdens are not felt equally across Chapel Hill communities

Difficulty in reaching everyone affected

Resistance to change

Slow transition to sustainable development patterns

The Town has limited control over community emissions and actions that contribute to climate change

Insufficient funding to meet climate goals

Improving and maintaining stormwater controls

Need for investments in major technology shifts, such as electric vehicles

Slow adoption of new technology

Opportunities

Set policies and practices that address racial inequities and drive outcomes

Build on statewide goal of reducing GHG emissions by 40% by 2025 (Executive Order 80)

Leverage Duke Energy's goal of being carbon neutral by 2050

Seek out new funding opportunities (grants, partnerships)

Establish new policies, incentives, regulations and partnerships that impact our two largest emissions sectors – buildings and transportation

Adopt more sustainable development and land use policies

Continue modeling best practices in energy use

Strengthen hazard mitigation and community resilience

Improve stormwater management

Promote and support sustainable living

Grow and leverage community partnerships

Create more economic and job opportunities



Greenhouse Gas (GHG) Inventory

What is a GHG Inventory?

A GHG inventory evaluates the current emissions within a community. Periodic GHG inventories allow communities to track their progress towards emissions goals. The inventory also establishes a baseline that is used to evaluate the effectiveness of potential mitigation and adaptation actions.

Two GHG inventories were prepared for Chapel Hill. The first assesses emissions at a community wide level, and the second focuses on emissions resulting from municipal actions. See the appendices for additional information about the sources of GHGs in our community.

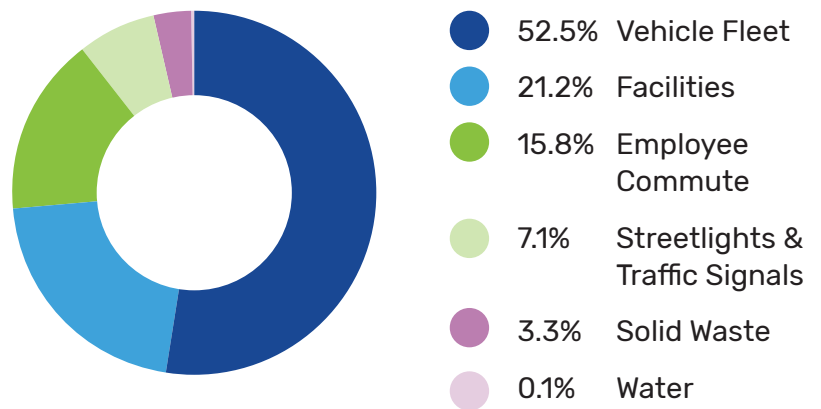
What standards guide the GHG Inventory process?

The GHG inventory follows the U.S. Community GHG protocol developed by ICLEI Local Governments for Sustainability. The calculations meet the standard reporting requirements defined by the Global Protocol for Community Scale Emissions Inventories. These protocols provide standards methods for estimating emissions from specific sources and activities.

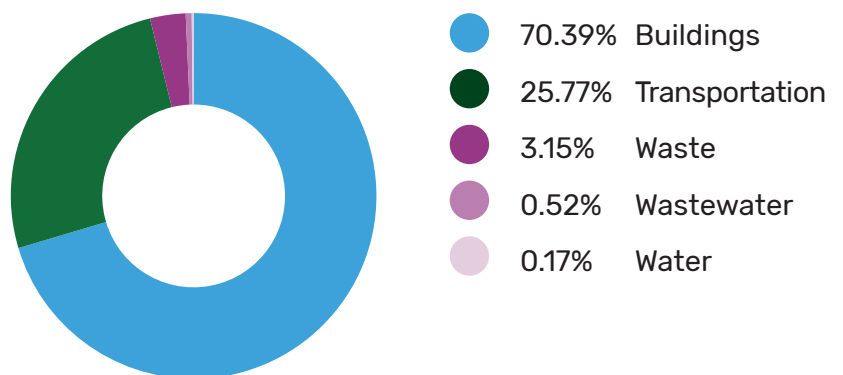
For more details on the Town and Community GHG Inventory, visit the full GHG inventory in the appendices.



Municipal GHG Emissions by Sector



Community GHG Emissions by Sector



What is included in our Community GHG Inventory?

The Chapel Hill community GHG inventory assesses emissions for the 2017 calendar year because it is the most recent year for which actual data is available for all sectors. The inventory looks at sources of GHG emissions by sector, as follows:



Buildings – The buildings sector includes the emissions from generating and using energy to power the buildings in which we live, work and play. It includes everything from the emissions coming from running power plants and manufacturing equipment to the refrigerators in grocery stores and movie theater projectors, to plugging in your cell phone charger or cooking on your stove. Across the community, about 80% of the GHGs from buildings are a result of electricity use and 20% from natural gas.



Transportation – The transportation sector includes emissions resulting from fuel consumption from all of the vehicle miles traveled on roads within the Town of Chapel Hill. This includes personal, commercial cars, trucks and buses.



Waste – The waste sector includes the emissions associated with the disposal of solid waste, including landfill and compost waste. Landfills are significant sources of GHGs, particularly methane.



Wastewater Treatment – The wastewater treatment sector accounts for the emissions that result from the wastewater treatment process.



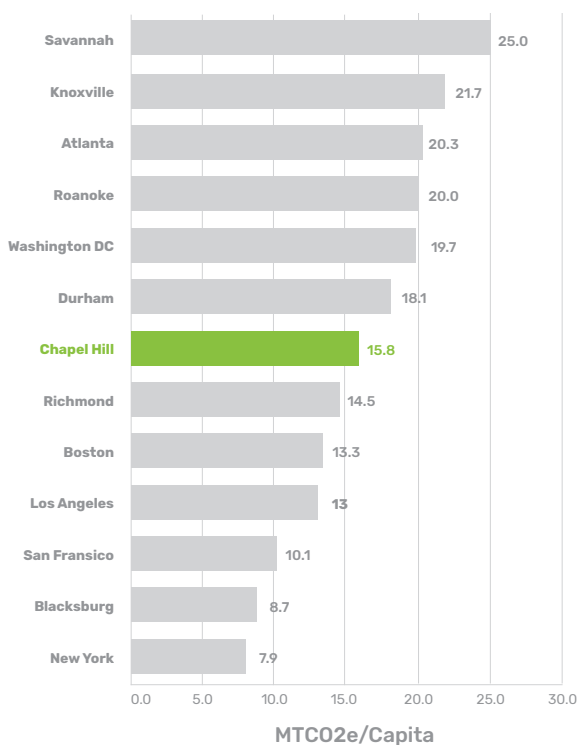
Water – The water sector includes emissions associated with delivering water throughout the community.



How are GHGs measured?

GHGs are measured in terms of carbon dioxide equivalent, or CO₂e. This measurement converts the effects of different GHGs to the amount of carbon dioxide that would cause the same amount of warming so it can be expressed as a single number. The GHG inventory calculates GHG emissions in metric tons of CO₂e, or MTCO₂e.

Community GHG Intensity Compared



What is included in the Municipal GHG Inventory?

The Town of Chapel Hill is committed to reducing the GHG emissions within its control. The Municipal GHG inventory is a subset of the community GHG inventory that takes a closer look at emissions from Town operations. Municipal GHG emissions are broken down into the following sectors:



Vehicle Fleet - The vehicle fleet sector calculates emissions based on vehicle miles traveled and fuel consumption for the cars, trucks, and buses owned and operated by the Town.



Facilities - The facilities sector is similar to the overall buildings sector in the community inventory. It accounts for emissions resulting from energy consumption in buildings that are owned and operated by the Town. Outdoor lighting is also included in these calculations.



Employee Commute - The employee commute sector is based on the miles traveled by Town employees going to and from work. It accounts for the types of commutes Town employees use, including driving alone, carpooling, or walking.



Streetlights and Traffic Signals - The streetlights and traffic signals sector calculates emissions from the electricity used to power streetlights and traffic signals that are owned and operated by the Town.



Solid Waste - The solid waste sector accounts for waste generated at Town facilities and sent to a landfill.

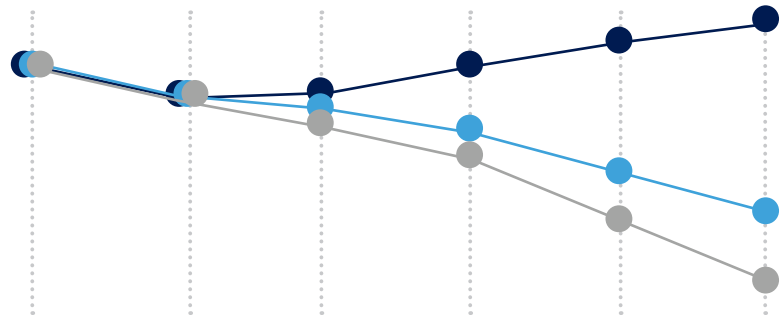


Water - The water sector includes both water treatment and delivery, and represents emissions that result from energy consumption from water treatment, extraction, pumping and supply for the amount of water supplied to Town facilities and operations.

GHG Projections

What is Business as Usual?

The Business as Usual forecast predicts what the GHG emissions in our community would be if we did not take any further climate actions. It considers population growth, current efforts, and anticipated improvements in vehicle and appliance efficiency.



2005	2017	2025	2030	2040	2050
1,047,516	937,085	948,471	1,054,381	1,146,026	1,226,096
1,047,516	937,085	887,670	802,643	638,216	484,414
1,047,516	937,085	823,287	698,021	453,115	218,834

- Business as Usual
- Climate Action & Response Plan (CARP) Implementation
- CARP + UNC Climate Actions

*2005 GHG estimates are based on Orange County data, apportioned based on population.

What do Chapel Hill's emissions mean?

Climate change is a global process. If global temperature increases are to be limited to 2 degrees or less this century as the Paris Agreement states, every community must reduce their GHG emissions proportionally.

Chapel Hill has been committed to reducing its emissions since 2006. Our community has made great progress, but additional GHG reduction efforts are needed to meet our goals. **The graph illustrates how the measures outlined in this plan can help us reach our goals in support of the Paris Agreement to limit the average global temperature increase.**



UNC-Chapel Hill's Greenhouse Gas Emissions

In 2019, UNC-Chapel Hill emitted 473,906 metric tons of carbon dioxide equivalents. This marks a 21% decrease from the 2007 baseline and the fifth consecutive year Carolina has reduced its greenhouse gas (GHG) emissions. This 21% reduction surpassed Carolina's 2020 goal of a 20% emission reduction. The reduction in 2019 was primarily driven by a decrease in coal use but was partially offset by an increase in commuting emissions. Carolina's full emissions trend can be seen in Figure 1 and a breakdown of 2019 emissions can be seen in Figure 2.

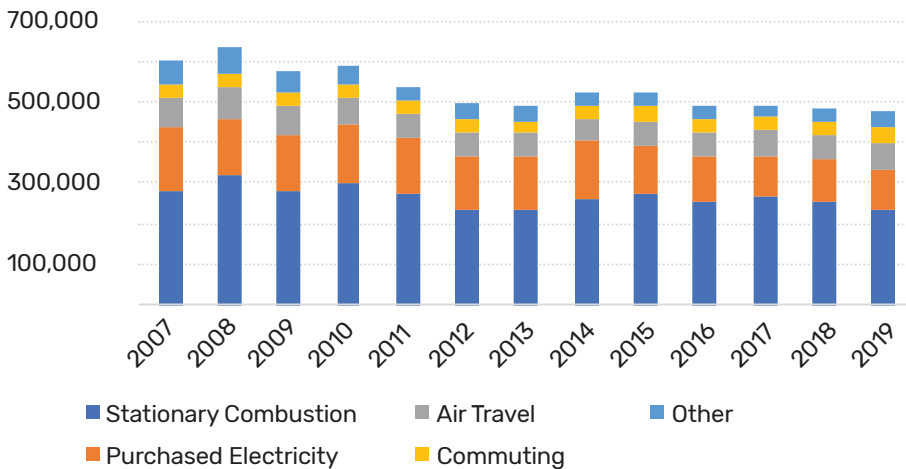


Figure 1. GHG Emissions by Category Since 2007

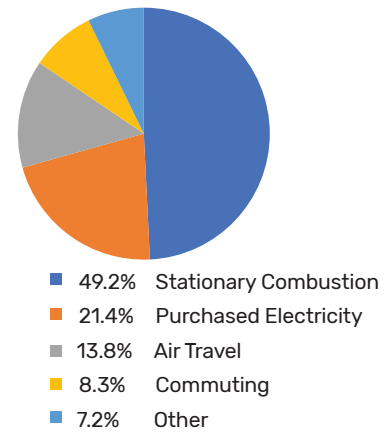


Figure 2. Breakdown of 2019 GHG Emissions

CAROLINA'S GREENHOUSE GAS AND ENERGY GOALS

In 2007, the University of North Carolina at Chapel Hill became a charter signatory of the American College and University President's Climate Commitment (ACUPCC). Carolina's 2009 Climate Action Plan then established a carbon neutrality date of 2050 and interim targets of a 20% reduction by 2020 and a 30% reduction by 2030.

Regarding energy efficiency, Carolina is currently working towards Governor Cooper's Executive Order 80 which states the state will strive to reduce building energy use intensity by at least 40% by 2025 from the 2005 baseline. Carolina has exceeded its previous goal of a 30% reduction in energy use intensity. In fiscal year 2019-20, Carolina had reduced its Energy Use Intensity (Btu/GSF) by 36% compared a 2002-2003 baseline.

CAROLINA'S GREENHOUSE GAS REDUCTION STRATEGIES

To meet Carolina's 2030 goal, and move the University to carbon neutrality, many carbon reduction strategies will be needed. A few of Carolina's main strategies are laid out below.

INCREASE ENERGY EFFICIENCY ON CAMPUS

Carolina's Energy Management team is continuously working to reduce campus energy use through low-cost energy conservation projects. These include LED retrofits, airflow reduction projects, HVAC optimizations and many more. Carolina also has a building optimization program that ensures buildings are functioning as designed to limit energy use.

ELIMINATE COAL USE

Carolina is working to eliminate coal use in the cogeneration facility as quickly as is technically and financially feasible without losing any reliability or resilience. In 2019, Carolina completed a burner restoration project at the cogeneration facility that will allow Carolina to significantly increase its natural gas use and reduce coal consumption.

INCREASE USE OF RENEWABLE ENERGY

Generating and purchasing renewable electricity is extremely important in lowering Carolina's emissions. Carolina is currently working on multiple on-site solar photovoltaic installations and is assessing its options for procurement of off-site renewable energy through Duke Energy.

ADDITIONAL STRATEGIES

Other strategies Carolina is using to limit its greenhouse gas emissions include increasing alternative commuting methods, using alternative fuels in fleet vehicles, prioritizing local foods, and educating its community members about how to reduce their personal footprints on and off campus.



Greetings from

OHIO

Scott Nurkin®
@Themuralshop

Taking Action Together

These actions are elements within the top five action categories described above and also build community resilience. The Climate Action and Response Plan focuses on taking action together. Through the planning process and engagement with Town staff, community partners and residents, actions were identified and prioritized for implementation. Actions are centered around 4 areas identified below and are described in more detail throughout the following pages in this section.



**Buildings
& Energy**



**Transportation
& Land Use**



**Waste, Water
& Other**




Resiliency

TOWN ACTIONS

-  Green building policy
-  Green municipal buildings
-  Municipal green retrofits and incentives
-  Creation of walkable, transit-served neighborhoods
-  Commute mode shift (walk, bike, transit)
-  Electrification of municipal fleet
-  Electrification of transit buses
-  Increase (fare-free) transit service
-  Protect water quality, natural, and agricultural resources
-  Green Infrastructure
-  Early warning systems for climate hazards and heat

COMMUNITY ACTIONS

-  Community green building for new construction
-  Community green building for retrofits
-  Building conversion to all electric
-  Greening of the grid
-  Community renewable energy
-  Electric vehicle charging
-  Transportation Demand Management
-  Zero waste
-  Resiliency and recovery
-  Climate action education, outreach, and awareness
-  Partnerships, funding, and incentives

Key Benefits of Taking Action

Many wider benefits will result from our community taking climate action, sometimes referred to as “co-benefits”. Several co-benefits are highlighted for the proposed actions which focus on climate equity and the overall wellbeing and sustainability of our community.



Public Health

Improving our community’s health and well-being as climate action improves environmental conditions.



Racial Equity and Climate Justice

Addressing inequities in climate change burdens on frontline community members and achieving an equitable distribution of climate action benefits.



Resilience to Stressors

Improving our ability to bounce back and bounce forward in the face of climate change.



Regional Partnerships

Working collaboratively across the region to take action.

Community Engagement in Climate Action

The Climate Action and Response Plan is a plan for the whole community, not just the Town. Approximately 98% of GHG emissions in Chapel Hill are the result of non-municipal activities from sources like vehicles, homes, businesses, and institutions. The Town can't reach our community's goals by itself, but a network of committed partners working throughout our community can. Climate action and response relies on community-wide partnerships to build a foundation for broad action.

How was the community involved in developing the Plan?

Community engagement has been ongoing through the Town's sustainability efforts in recent years and has been incorporated into the climate action planning process. The Town solicited community input on the Climate Action and Response Plan through online surveys, shared information through social media, and gathered stakeholders together in a Community Partners Climate Action Summit. Thirty-six individuals representing a variety of stakeholder organizations participated in the Summit. These community leaders and others will be engaged in future climate action outreach.

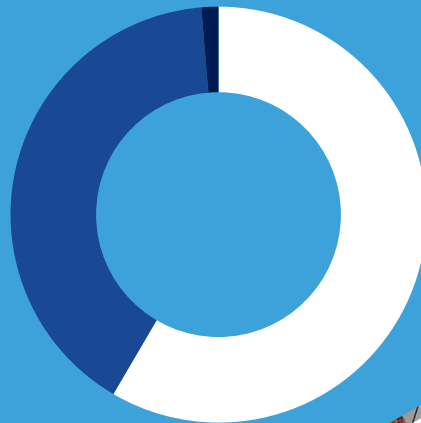
How will the community stay engaged in climate action moving forward?

The Climate Action and Response Plan will rely on community involvement through our partners in the coming years. The Town has developed and will continue to develop COVID-safe engagement resources including presentations, online surveys, and toolkits for use by community partners so that they can continue to share information and engage with the community for future climate action. We will continue to build on partnerships and develop relationships throughout the community to support climate action.

Chapel Hill Municipal and Community Emissions

● Community	547,589
● Municipal	12,378
● UNC	377,118
Total	937,085

Scope 1 and 2 emissions



Engagement Activities

COVID-19 hit our community just as the public engagement portion of the project began. We responded by implementing a variety of online engagement strategies. This work included a video and survey that were published in English, Spanish and Mandarin Chinese, as well as virtual meetings and “office hours”.

Community Opinion Survey

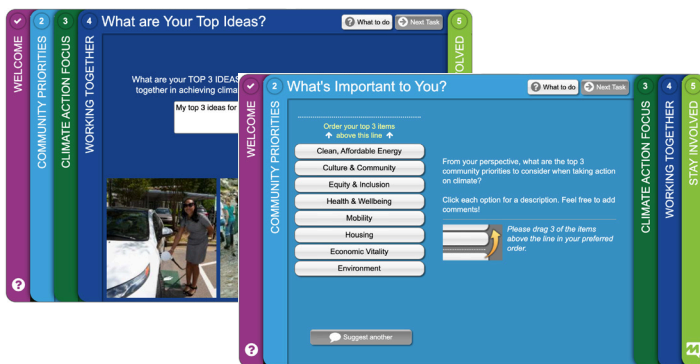
Following the climate action community partners summit, we launched a wider climate action opinion survey featured on the town’s sustainability website (sustainchapelhill.org) and on social media. The survey focuses on the challenges and opportunities that individual community members see to implementing climate action.

Key Thoughts from Community Survey

- Challenges include limited Town control and taking action that is accessible and affordable for all
- Needs include incentives, partnerships and advocacy to drive action

Respondents said the Town should:

- Plan for a community that requires less driving and supports more walking, biking and transit service
- Build more climate-resilient infrastructure
- Adopt climate-smart development rules



Metroquest Survey

Ahead of the summit, we distributed a targeted survey to key community stakeholders and organizations to solicit input on community priorities, focus areas for climate action, and ideas for working together between the Town and community.



Chapel Hill Climate Action Video

We uploaded a climate action plan video to the Town’s sustainability website to share information on the project and encourage participation in the community survey.

Wider Community Benefits of Climate Action

Most climate actions offer a variety of benefits in addition to mitigating GHG emissions or improving resilience to climate change. These are referred to as Co-benefits and include:

- Improved equity outcomes for all
- Lower costs and greater affordability
- Improved energy security and reliability
- Decreased risk of energy shortages or outages
- Reduced pollution
- Improved air quality
- Improved health outcomes
- Improved economy
- Expanded local jobs creation
- Expansion of transportation choices
- Reduced traffic congestion
- Improved safety
- Improved disaster preparedness
- Enhanced and protected natural environment
- Reduced water consumption
- Reduced waste and litter














How do businesses benefit from taking climate action?

Mitigating and adapting to climate change makes our community cleaner, healthier, and more resilient, and that's good for our economy. Major global investors and large corporations are starting to include sustainability actions to reduce their risk to climate impacts. Businesses with experience in climate action and response have found that it also leads to:











- Lower costs, increased efficiency, and higher profits
- Innovative ideas
- Competitive advantages in attracting and retaining talent
- A comprehensive understanding of the full environmental, social, and economic impacts of their operations.
- Insight into future possibilities and investment opportunities
- Marketing and branding opportunities
























Climate Actions Summary Table

The following pages summarize the objectives, potential impacts, and resources needed for implementation of the proposed Town and Community actions. Sections following this table are organized by the key focus areas of the plan (Buildings & Energy; Transportation & Land Use; Waste, Water, & Other; Resiliency) present more detail on each action including the quantification of GHG emissions reductions, for applicable actions.

ACTION	LEVEL OF COSTS	GHG REDUCTION POTENTIAL (MTCO2e)	SCOPE	CO-BENEFITS
 BUILDINGS AND ENERGY				
Green building for new construction, including Green building policy	\$*	 114,853	Town and Community	  
Green municipal buildings (retrofits and new construction)	\$\$\$\$*	 804	Town	  
Green retrofits of existing buildings (other than municipal)	\$*	 18,582	Town and Community	  
Building Conversion to all electric	\$*	 62,186	Community	 
Greening of the Grid	N/A	 374,022	Community	  
Community Renewable Energy	Cost Range TBD	 (non-quantified)	Community	  

Legend

-  Positive
-  Town Capital/program costs <\$250K
-  Public Health
-  Neutral
-  Town Capital/program costs <\$1M
-  Equity/Climate Justice
-  Town Capital/program costs \$1-5M
-  Resilience to Stressors
-  Town Capital/program costs >\$5M
-  Regional Partnerships
- MTCO2e** Metric tons of carbon dioxide equivalent
- * Exact Cost TBD

ACTION	LEVEL OF COSTS	GHG REDUCTION POTENTIAL (MTCO2e)	SCOPE	CO-BENEFITS
 TRANSPORTATION & LAND USE				
Creation of walkable, transit-served neighborhoods	\$*	+ 19,905	Town	  
Extend goals for increasing bicycling, walking, and transit modeshare	\$\$\$\$*	+ 12,505	Town	  
Electrify the municipal fleet	\$\$ \$450,000	+ 803	Town	  
Electrify buses	\$\$\$ \$2.82M	+ 4,572	Town	  
Increase transit with Bus Rapid Transit	\$\$\$\$ \$200M	+ 2,305	Town	   
Electric Vehicle charging	\$\$\$ \$1.7M	+ 107,028	Town and Community	  
Expand Transportation Demand Management	\$-\$-\$*	+ 24,119	Town	  





Legend










- + Positive
- Neutral
- Negative
























MTCO2e Metric tons of carbon dioxide equivalent

- \$ Town Capital/program costs <\$250K
- \$\$ Town Capital/program costs <\$1M
- \$\$\$ Town Capital/program costs \$1-5M
- \$\$\$\$ Town Capital/program costs >\$5M












* Exact Cost TBD

-  Public Health
-  Equity/Climate Justice
-  Resilience to Stressors
-  Regional Partnerships

ACTION	LEVEL OF COSTS	GHG REDUCTION POTENTIAL (MTCO2e)	SCOPE	CO-BENEFITS
 WASTE, WATER, AND OTHER				
Zero Waste	\$\$\$\$*	 (non-quantified)	Town and Community	  
Protect Water Quality, Natural, and Agricultural Resources	Cost range TBD		Town and Community	  

 RESILIENCY				
Early Warning Systems for Climate Hazards and Heat	Cost range TBD		Town	   
Green Infrastructure	Cost range TBD		Town	  
Climate Action Education, Outreach, and Awareness	\$-\$*\$	 (non-quantified)	Town and Community	   
Partnerships, Funding, and Incentives	Cost range TBD		Town and Community	 
Community-wide Resiliency and Recovery	Cost range TBD		Town and Community	   

Legend

-  Positive
-  Neutral
-  Negative
- MTCO2e** Metric tons of carbon dioxide equivalent
-  Town Capital/program costs <\$250K
-  Town Capital/program costs <\$1M
-  Town Capital/program costs \$1-5M
-  Town Capital/program costs >\$5M
- * Exact Cost TBD
-  Public Health
-  Equity/Climate Justice
-  Resilience to Stressors
-  Regional Partnerships

Buildings & Energy

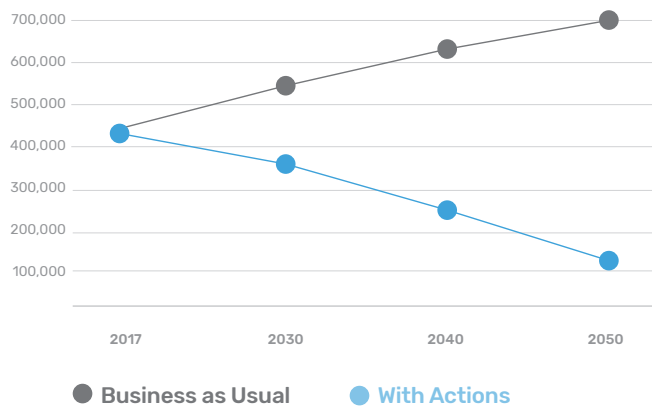


OVERVIEW

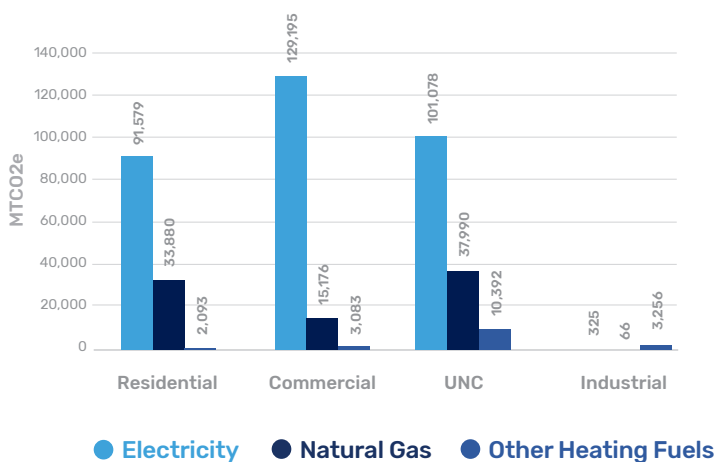
Together, buildings and energy account for the largest share of GHG emissions in our community. Improving the efficiency of existing and new buildings, reducing energy use, and transitioning to cleaner energy sources can help reduce GHGs from the building and energy sector. State and local goals for GHG reduction and becoming carbon neutral rely on changes in energy supply and its use in buildings.

Current and Forecast Greenhouse Gas Emissions from Buildings & Energy

Existing and Forecast GHGs from Buildings - "Business as Usual" v. Taking Action (MTCO₂e)



2017 Community GHGs from Building Energy (MTCO₂e)



CARBON NEUTRAL

Carbon neutral means taking actions to remove as much carbon dioxide from the atmosphere as we put into it, achieving a net zero carbon emissions.

Top Buildings & Energy Actions

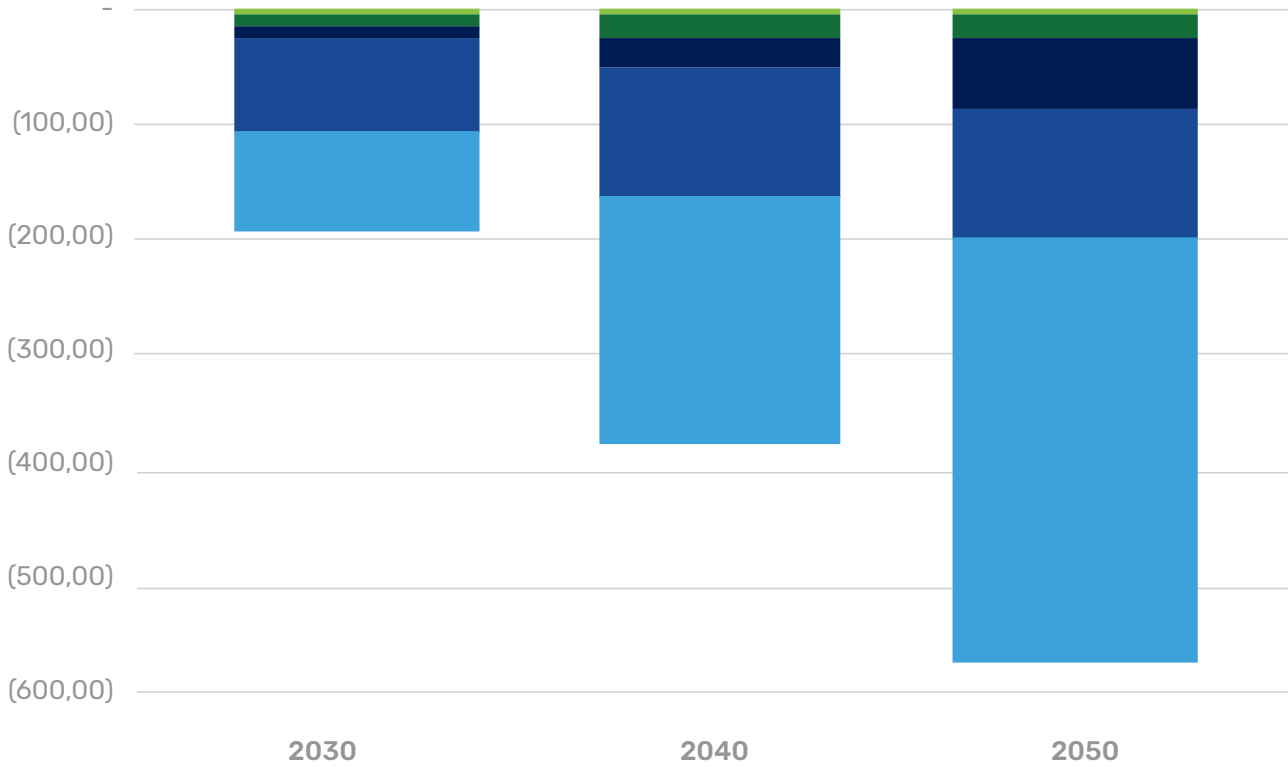
TOWN ACTIONS	COMMUNITY ACTIONS
Green Building Development Ordinance	Community green building for new construction
Green municipal building	Community green building for retrofits
Incentives for green retrofits	Community building electrification
	Greening of the grid



Buildings & Energy

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS

Forecast GHG Emissions Reduction Potential from “Top Town and Community Actions - Buildings and Energy” (MTCO₂e)



Buildings & Energy Metrics

INDICATOR	MEASURE(S)	HOW/WHY WE MEASURE
Reduction in GHGs for buildings and energy sector	MTCO ₂ e by sector	An increase in clean energy will lead to a corresponding decrease in GHGs
Percent of energy from clean, renewable sources	Percent	To meet our stated goals, the percentage of energy coming from clean sources must increase over time.
Number of buildings meeting LEED or similar standards	Percent	More buildings meeting green building goals indicate that we are building greener.



ACTION

Green Building for New Construction

Our homes, offices, schools, stores, and other buildings account for a large portion of our community’s GHG emissions. Each building’s design and construction determines how it affects the environment. Green building means making environmentally friendly choices in how buildings are designed, built, and operated. Green building strategies lower emissions, reduce other environmental negative impacts, and save money.

The Town can address green building through a **Green Building Policy** that updates the Council’s current policy. The community as a whole can choose to implement **green building strategies** independently of Town requirements.

Vision

Achieve 100% zero net energy in new construction buildings by 2050

Green Building Strategies

- Cool roofs, effective insulation and quality, efficient building materials
- More efficient plumbing fixtures, heating and cooling systems, and appliances
- Orienting the building to use natural heating, cooling, and daylight when possible
- Recycling and minimizing construction waste
- Incorporating recycled, reclaimed, or sustainable materials
- Native and water-efficient, drought resistant landscaping
- Incentives, fee waivers, tax rebates, low-cost loans, expedited permitting, recognition programs

Implementation Cost (Town):

Some costs for administration, promotion and coordination for ordinance

WHAT IS THE TOWN DOING?

The Town has previously encouraged developers to design projects that are “20 percent more energy efficient than the latest version of ASHRAE 90.1”. The County has a Regulated Recyclable Material Ordinance which requires that construction and demolition projects in Chapel Hill have a waste management plan.

WHO WITHIN OUR COMMUNITY CAN HELP?

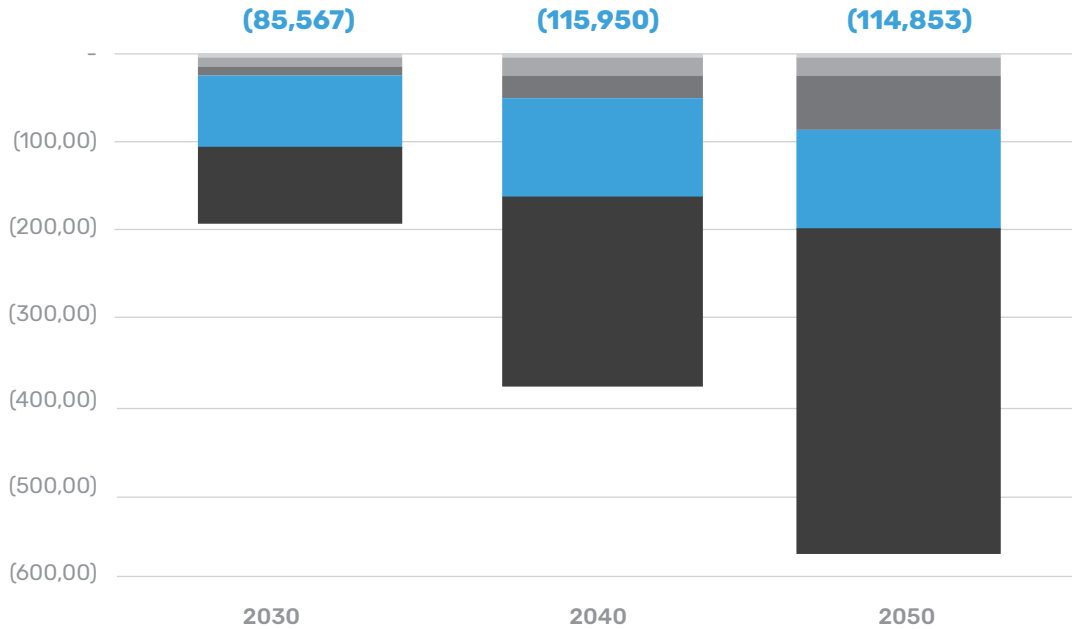
- Architects/Engineers
- Green Buildings and Zoning Experts
- Contractors
- Lenders
- Building Owners/Investors
- UNC-Chapel Hill



ACTION

Green Building for New Construction

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO2e)



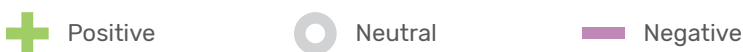
As the energy grid improves (see Greening of the Grid action), the potential GHG benefit of reduced electricity use through green building practices is reduced in later years.



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	○	+
Potential Impacts	<ul style="list-style-type: none"> + Improved indoor and outdoor air quality + Positive health outcomes for those who live and work in green buildings 	<ul style="list-style-type: none"> + Improved environmental conditions + Lower operating costs - Potential higher housing costs/values 		<ul style="list-style-type: none"> + Strategies may improve resilience or reduce impact of stressors

Legend





ACTION

Green Municipal Buildings

Retrofitting our **existing** Town government buildings to bring them up to green building standards can reduce the Town's emissions considerably. Constructing any **new** buildings to meet these standards also keeps emissions as low as possible. Independent industry standards can guide the Town's efforts to improve buildings.

Vision

Achieve 100% net zero in new municipal buildings and retrofits by 2030

Standards

- Leadership in Energy and Environmental Design (LEED) is a green building rating system that provides a framework for healthy, highly efficient, and cost-saving buildings
- American Institute of Architects (AIA) 2030 Challenge sets targets for GHG-emitting and energy consumption performance standards that progressively increase to being carbon-neutral in 2030

WHAT IS THE TOWN DOING?

New or expanded Town government facilities are built to AIA 2030 fossil fuel reduction targets and LEED rating systems.

Implementation Cost (Town):

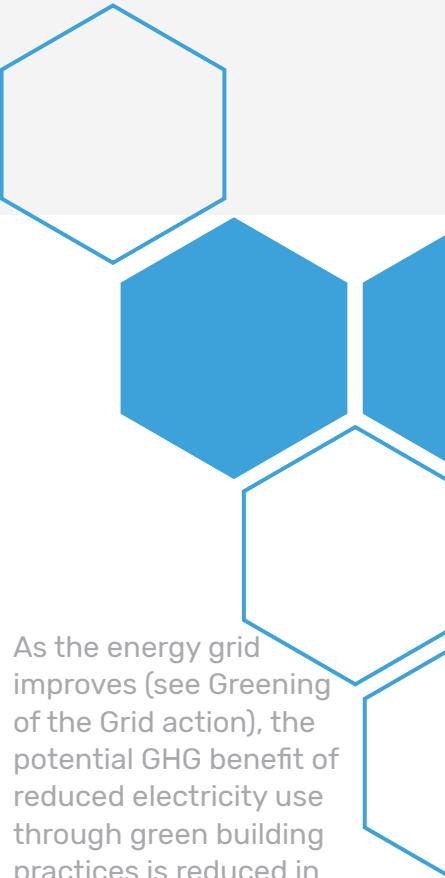
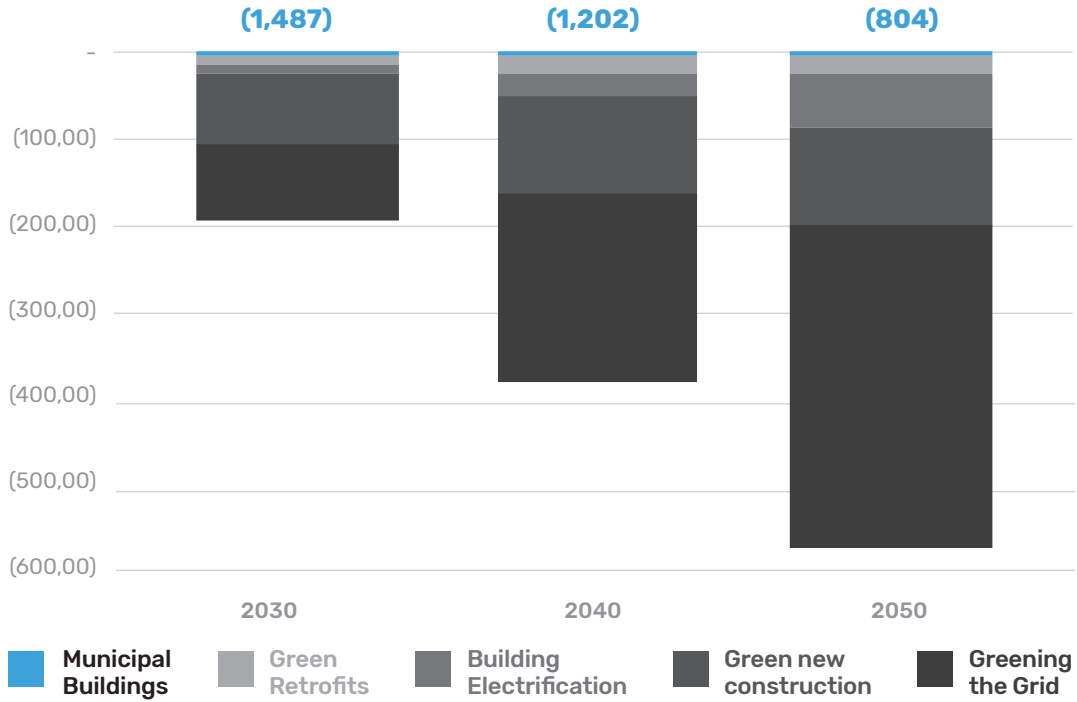
Costs to be estimated; includes the Municipal Service Center, which could replace up to 4 four existing buildings by 2025



ACTION

Green Municipal Buildings

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



As the energy grid improves (see Greening of the Grid action), the potential GHG benefit of reduced electricity use through green building practices is reduced in later years.

OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+	○	+
Potential Impacts	<ul style="list-style-type: none"> + Improved indoor and outdoor air quality + Positive health outcomes for those who live and work in green buildings 	<ul style="list-style-type: none"> + Improved environmental conditions 		<ul style="list-style-type: none"> + Strategies may improve resilience or reduce impact of stressors

Legend

- + Positive
- Neutral
- Negative



ACTION

Green Retrofit of Existing Buildings

Older buildings are generally less efficient than newer buildings, however, green building strategies are often similar for new construction and retrofits. Retrofits can be expensive and challenging for buildings that were not originally designed to accommodate the systems to be integrated.

The Town can provide incentives to encourage building owners to retrofit their buildings with energy upgrades and other green building strategies. Community partners can help to provide incentives or to implement building retrofits.

Vision

Retrofit 15% of commercial and 30% of residential buildings to 50% net zero by 2050.

Possibles Incentives for Green Buildings

- Grant programs
- Development bonuses for LEED-certified buildings
- Loans or other funding programs
- Rebates
- Local certifications or recognition programs
- Tax incentives

Implementation Cost (Town):

Minimal to Town; \$67M in residential (7,069 households, approx. \$9,500/household); \$21M in commercial retrofits (30 at \$697k/retrofit); net cost savings by 2040

WHAT IS THE TOWN DOING?

The Town is just beginning to consider opportunities for offering incentives and development bonuses for building retrofits.

WHO WITHIN OUR COMMUNITY CAN HELP?

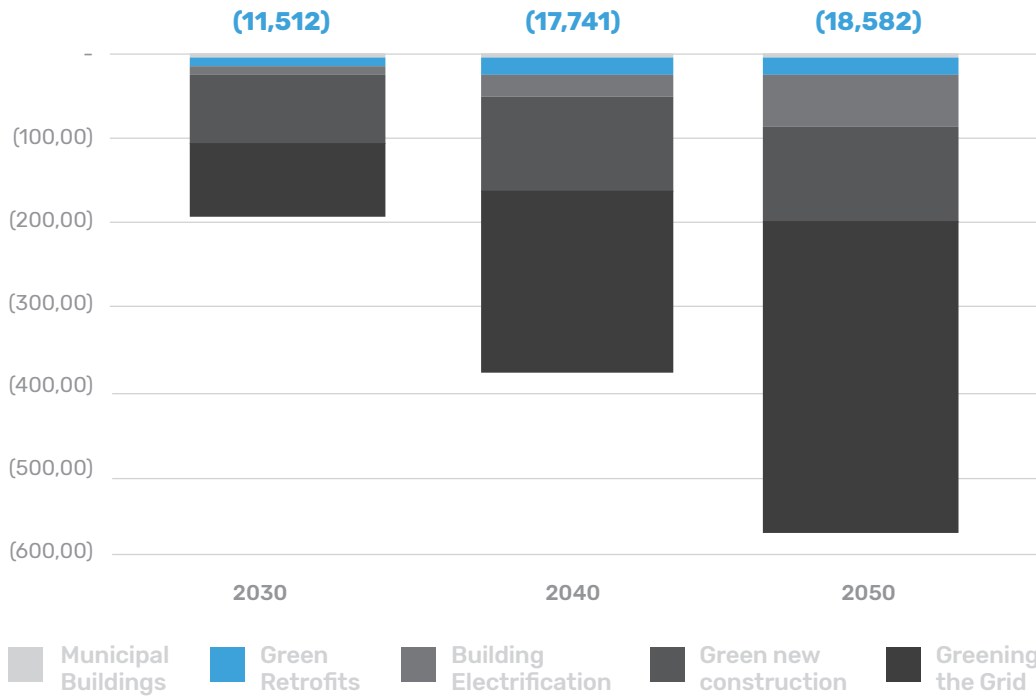
- Architects/Engineers
- Contractors
- Lenders
- Building Owners/Investors



ACTION

Green Retrofit of Existing Buildings

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	○	+
Potential Impacts	<ul style="list-style-type: none"> + Improved indoor and outdoor air quality + Positive health outcomes for those who live and work in green buildings 	<ul style="list-style-type: none"> + Improved environmental conditions + Lower operating costs - Availability of incentives will affect equity of retrofit efforts 		<ul style="list-style-type: none"> + Strategies may improve resilience or reduce impact of stressors

Legend

- + Positive
- Neutral
- Negative



ACTION

Building Conversion to All Electric

Building electrification means converting natural gas and fuel oil energy use in buildings to electricity by replacing systems and appliances, such as heating and cooling systems, and cooking appliances, to operate on electricity.

Vision

Achieve all-electric energy for new construction by 2030 and retrofit 20k residences to all electric by 2050.

Building Electrification Strategies

- Installing electric appliances and systems in new residential and commercial buildings
- Replace appliances and systems that use natural gas or fuel oil in existing residential and commercial buildings

Implementation Cost (Town):

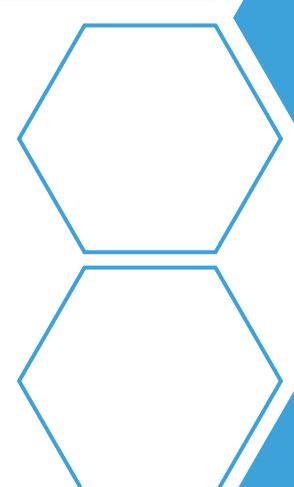
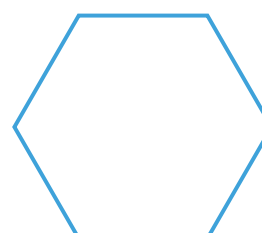
Minimal to Town; Private investment for green new construction/\$280M for 20k residences (\$14k/household)

WHO WITHIN OUR COMMUNITY CAN HELP?

- Property/building owners
- Developers
- Contractors
- Suppliers and retailers
- Non-profits

INCREASING IMPACT OF BUILDING ELECTRIFICATION

Electrifying buildings with heat pumps will become more impactful as our electricity mix gets cleaner. First, these technologies will improve the overall energy efficiency of heating and cooling buildings. The remaining energy will switch from fossil fuels like natural gas to electricity. This will result in more electricity use, but far less natural gas. In the future newly added electricity use will be supplied by more renewable energy and have fewer GHGs for every new kWh added.

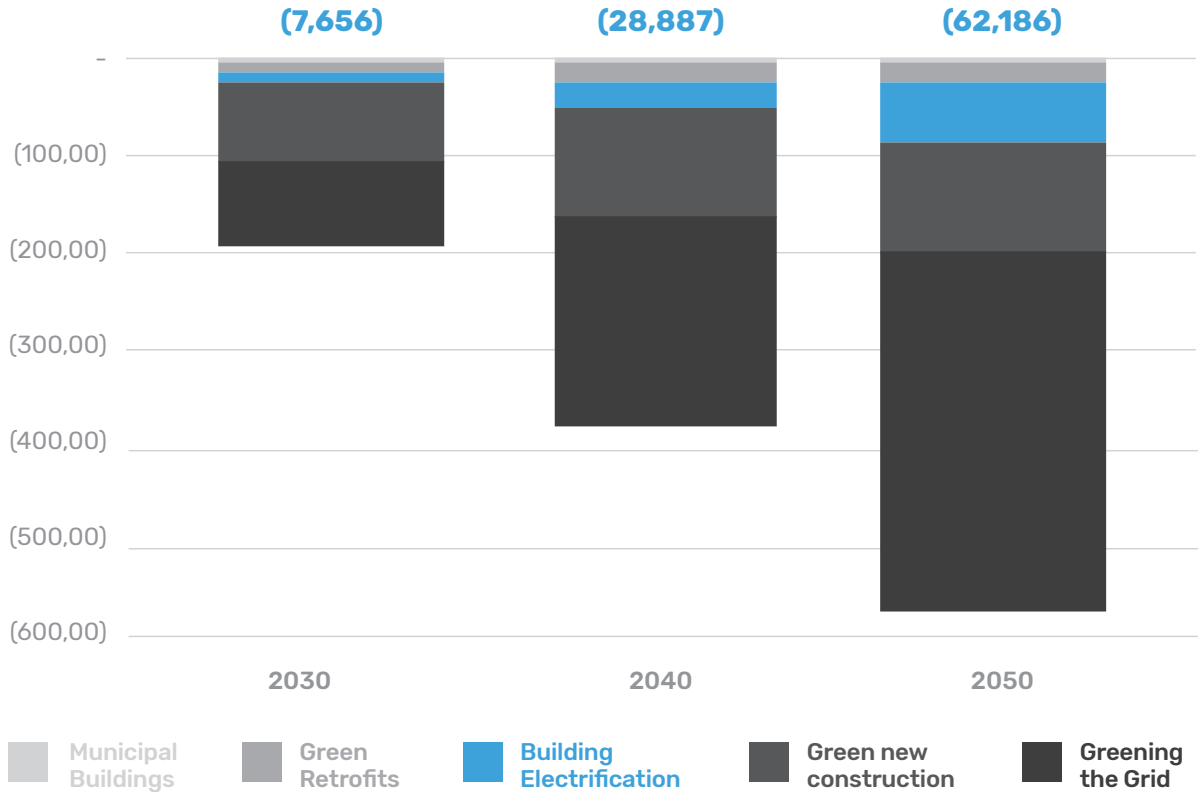




ACTION

Building Conversion to All Electric

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	○	○
Potential Impacts	+ Improved air quality	• Potential change in energy costs		

Legend

- + Positive
- Neutral
- Negative



ACTION

Greening of the Grid

Greening of the grid means shifting power generation that is carried over our utility grid to clean, renewable energy sources. Generating electricity from fossil fuels produces high levels of GHGs. Sources like solar or geothermal energy greatly reduce the GHGs from the energy sector. The major utility providers in Chapel Hill are Duke Energy, Dominion Energy, and UNC (to campus facilities). These major public utilities, renewable energy partners, and individual residents may contribute to Greening of the Grid.

Vision

Duke Energy and Dominion Energy have plans to achieve net zero carbon emissions by 2050

Greening the Grid Strategies

- Advocacy
- Duke Energy’s transition to more solar generation
- State and Duke Energy goals for carbon neutrality
- Supporting UNC in their transition away from coal
- Work with utility companies to develop utility scale renewable projects

PROVIDING COMMUNITY RENEWABLE ENERGY OPTIONS

Green Source Advantage Program (Charlotte)

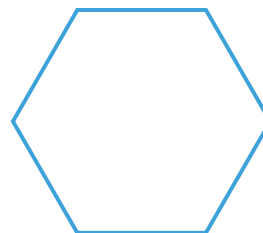
The City of Charlotte is partnering with two solar energy companies and participating in this Duke Energy program to provide a community level solar energy project, purchasing renewable energy through a special utility tariff rate, called a “utility green tariff”.

Implementation Cost:

N/A

WHO WITHIN OUR COMMUNITY CAN HELP?

- Energy producers and suppliers
- Renewable energy partners
- UNC-Chapel Hill
- Residents

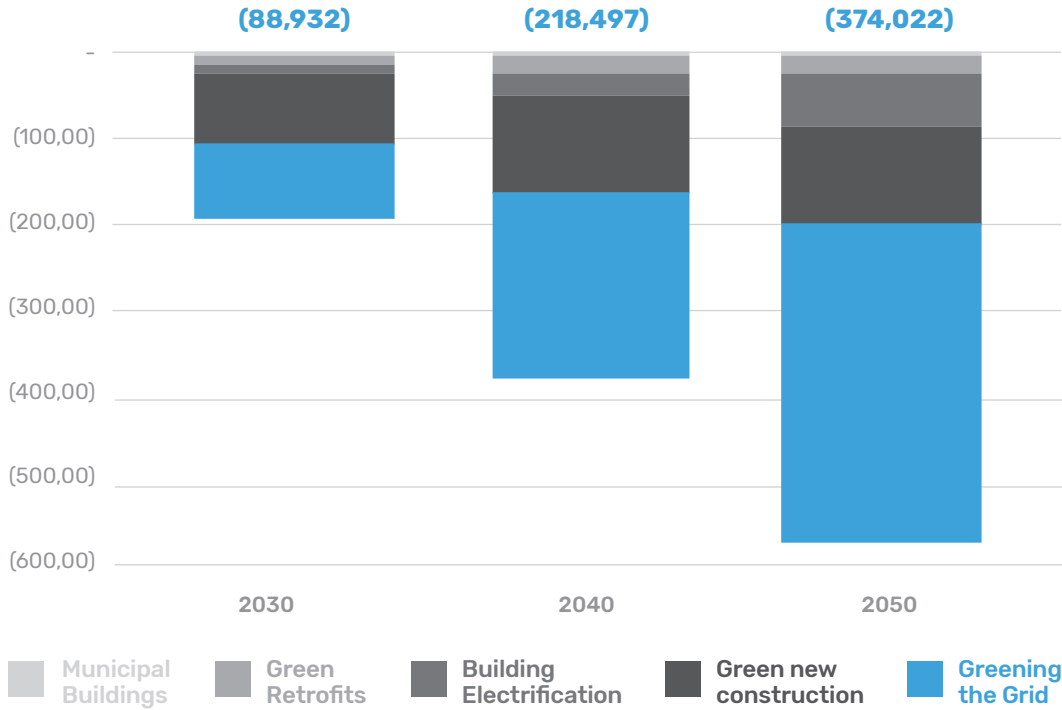




ACTION

Greening of the Grid

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / ○	+	+
Potential Impacts	+ Improved air quality	+ Improved environmental conditions • Potential changes in energy costs	+ Potential for regional coordination on greening of the grid and community solar	+ Reduced dependence on fossil fuels

Legend

- + Positive
- Neutral
- Negative



ACTION

Community Renewable Energy

Community renewable energy is when participants share the output from a community-owned renewable energy generator, such as a solar array. Participants may receive credits on their electricity bill for their use of the shared supply.



WHO WITHIN OUR COMMUNITY CAN HELP?

- Architects/Engineers
- Contractors
- Lenders
- Building Owners/Investors

Implementation Cost (Town):

Costs TBD based on Community Renewable Energy options explored

OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / ○	+	+
Potential Impacts	+ Improved air quality	+ Growth in green jobs + Improved environmental conditions • Potential change in energy cost	+ Opportunities to share renewable energy with others in the region	+ Reduced dependence on fossil fuels

Legend

- + Positive
- Neutral
- Negative

Transportation & Land Use

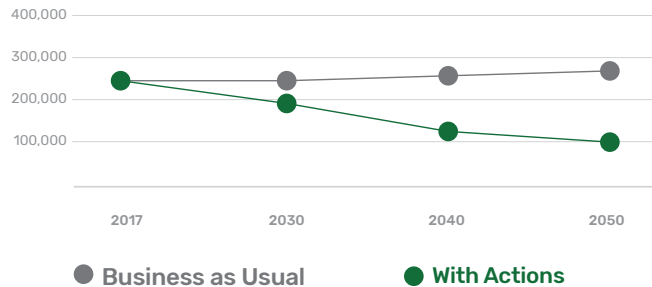


OVERVIEW

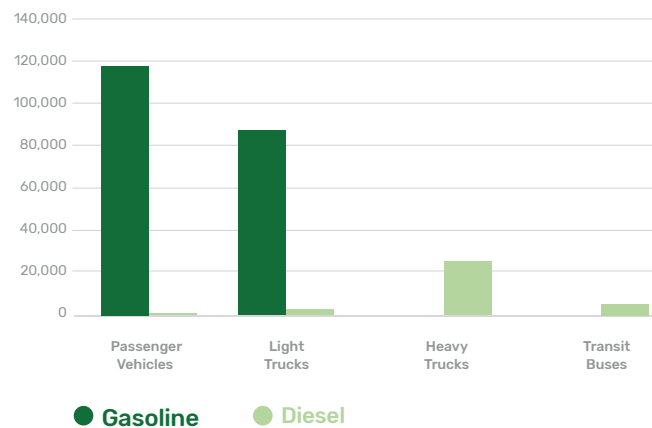
The transportation sector is the second largest source of GHG emissions in Chapel Hill (35%). Reducing emissions from transportation in our community will be a collaborative effort between the Town, regional partners, businesses, and individuals. The Town and other regional governments can encourage land use patterns that support a variety of transportation options and provide the transportation infrastructure to make these options available. Businesses can operate vehicles with lower emissions and support commute alternatives for workers. Individuals can choose to walk, cycle, take transit, or invest in lower emission vehicles.

Current Greenhouse Gas Emissions from Transportation

Existing and Forecast GHGs from Transportation - "Business as Usual" v. Taking Action (MTCO₂e)



2017 Community Vehicle Emissions by Vehicle and Fuel Type (MTCO₂e)



The Chapel Hill Mobility and Connectivity Plan sets a goal of achieving 35% bicycling, walking, and transit modeshare for commuting in Chapel Hill by 2025. This goal is in line with the 4% increase in these modes achieved between 2011 and 2015. This plan is in line with Chapel Hill’s climate action efforts.

Top Transportation & Land Use Actions

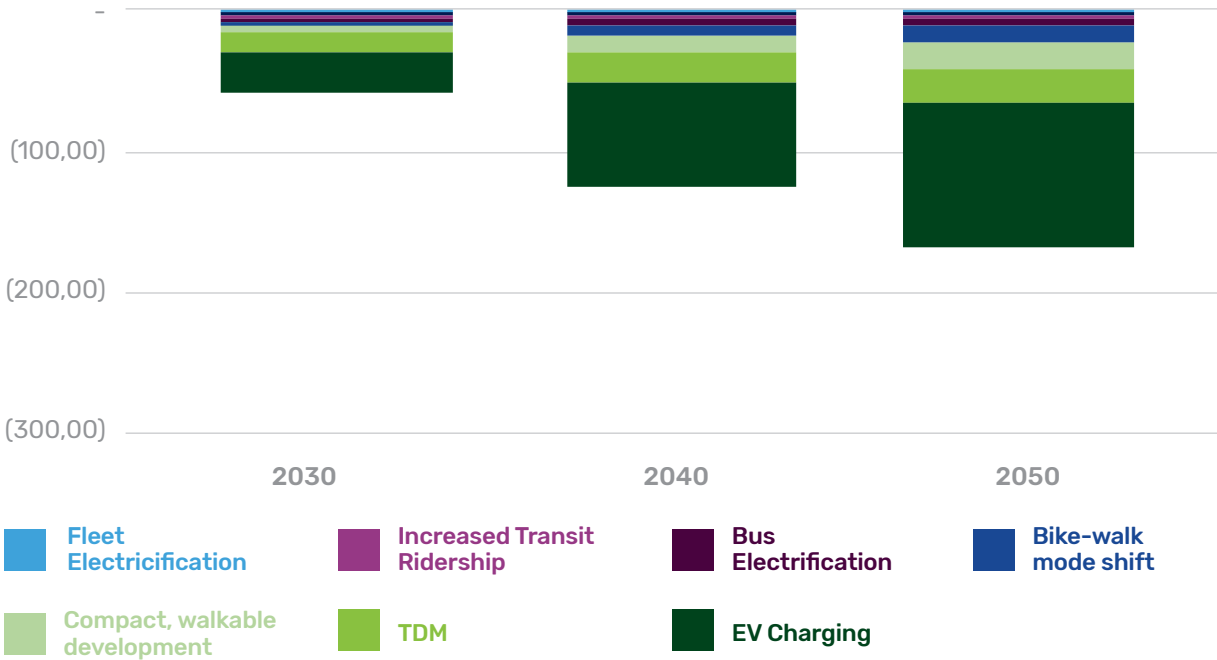
TOWN ACTIONS	COMMUNITY ACTIONS
Promote compact, walkable, bikeable development	Expand community EV charging infrastructure
Electrification of Town fleets and Chapel Hill Transit buses	Expand Travel Demand Management
Increase transit with Bus Rapid Transit (BRT)	Extend goals for increasing bicycling, walking, and transit modeshare
Extend goals for increasing bicycling, walking, and transit modeshare	Greening private and commercial fleets and commuting trips



Transportation & Land Use

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS

Forecast GHG Emissions Reduction Potential from “Top Town and Community Actions - Transportation and Land Use” (MTCO₂e)



Transportation & Land Use Metrics

INDICATOR	MEASURE(S)	HOW/WHY WE MEASURE
Vehicle travel	Vehicle Miles Traveled (VMT)	Reduction in VMT directly relates to transportation emissions. Data on VMT is readily available.
Pedestrian and bicycle travel	Pedestrian and bicycle counts Mode Share	Pedestrian and bicycle counts and mode share can track shifts to these modes of travel over time. Sources may include the North Carolina Non-Motorized Volume Data Program or local data
Pedestrian and bicycle facilities	Miles of bike lanes Funded projects (bike facilities, sidewalks, ADA improvements)	Implemented bicycle and pedestrian facility investments and improvements support shifts to these modes of travel over time.
Walkability	Walkscore GIS analysis	Walkability evaluation tools assess the availability of destinations and pedestrian and/or bicycle connections between them.



ACTION

Creation of Walkable, Transit-Served Neighborhoods

The structure of our neighborhoods and our transportation choices are deeply connected. People are more likely to walk or bicycle when their destinations are relatively close together and when there are safe, interesting and comfortable places to walk or cycle. Compact, walkable development patterns can reduce vehicle travel and emissions, as well as promoting healthier lifestyles.

Vision

Creation of numerous walkable, mixed-use neighborhoods that are served by transit and/or connected by robust pedestrian and bicycle networks.

Strategies to promote walkable, compact development

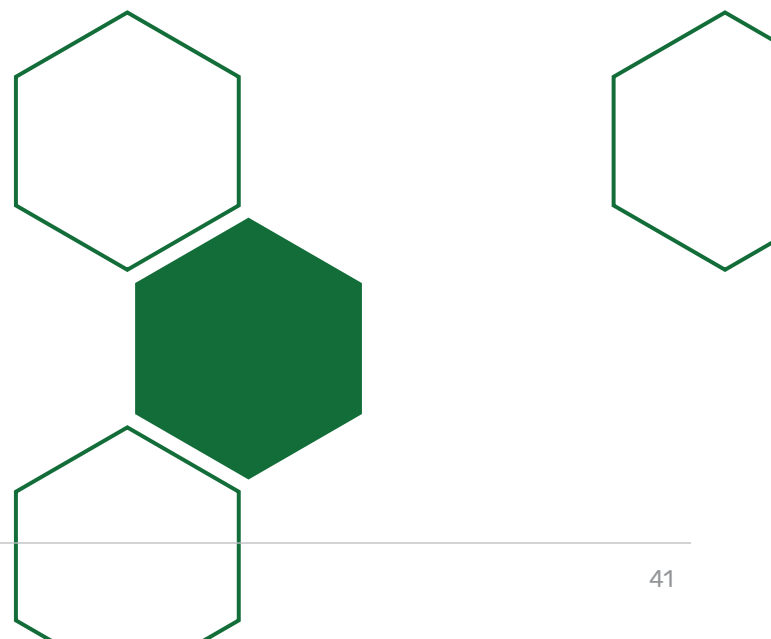
- Develop and implement supportive zoning and engineering standards
- Integrated land use and transportation planning
- Offer density bonuses or other incentives to developers
- Work with developers to encourage compact development
- Reduce parking space, lot size or building setback requirements
- Establish pedestrian only or car-free zones
- Connect bicycle and pedestrian facilities to planned development

WHAT IS THE TOWN DOING?

The Town has experimented with zoning strategies to encourage walkable redevelopment of suburban commercial areas, encouraged developers to create compact, walkable development and is currently updating its Land Use Management Ordinance (LUMO).

Implementation Cost (Town):

Some costs for administration, promotion and coordination for zoning strategy

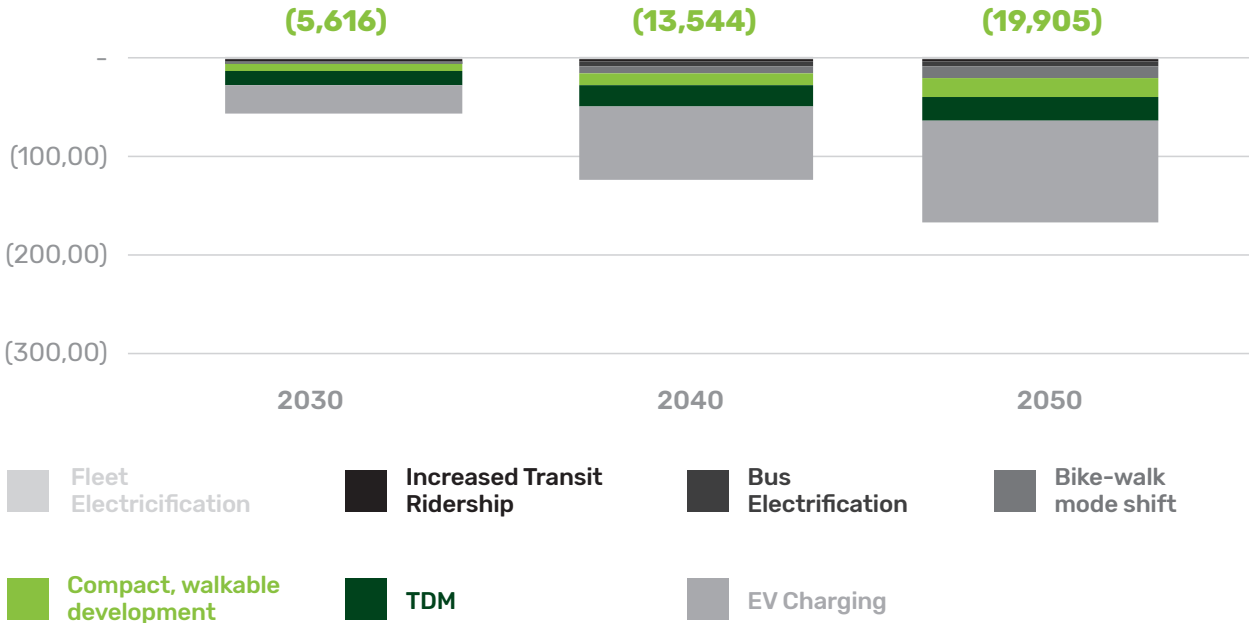




ACTION

Zoning for Walkable, Compact Development

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	+	+
Potential Impacts	<ul style="list-style-type: none"> + Increased physical activity levels + Improved air quality 	<ul style="list-style-type: none"> + Improved neighborhood cohesion - Housing Affordability 	<ul style="list-style-type: none"> + Regional greenways and trail linkages + Enhanced bike/ped connections to regional transit service 	<ul style="list-style-type: none"> + Improves access to community services and resources

Legend

- + Positive
- Neutral
- Negative



ACTION

Extend goals for increasing bicycling, walking, and transit activity (mode shift)

Walking and cycling are zero-emission transportation options that also promote public health. People choose transportation that is safe, convenient, and reliable. When facilities for walking and cycling are limited, people are less likely to walk or ride a bike. Providing alternatives to driving is critical if we want people to drive less.

Transit moves more people in few vehicles, resulting in lower emissions than driving alone. Transit riders may also combine their ride with walking or bicycling. Replacing single-occupancy vehicle trips with a combination of walking, cycling, and transit leads to reduced emissions and a healthier community.

Vision

Fully implement the Town Mobility Plan through 2035 and continue shifts to more walking, biking, and transit, reducing Single Occupancy Vehicle commutes by 33% by 2050.

Strategies to promote walkable, compact development

- Construct multimodal facilities as shown in the Town’s Mobility Plan
- Develop a robust, well-connected network of trails, greenways, sidewalks, and bike lanes
- Provide a well-connected and convenient transit network

WHAT IS THE TOWN DOING?

The Town has completed more than 23 miles of greenways and trails so far. Our Mobility Plan has a goal for 35% of all commuters to bike, walk, and ride transit to work by 2025.

Implementation Cost (Town):

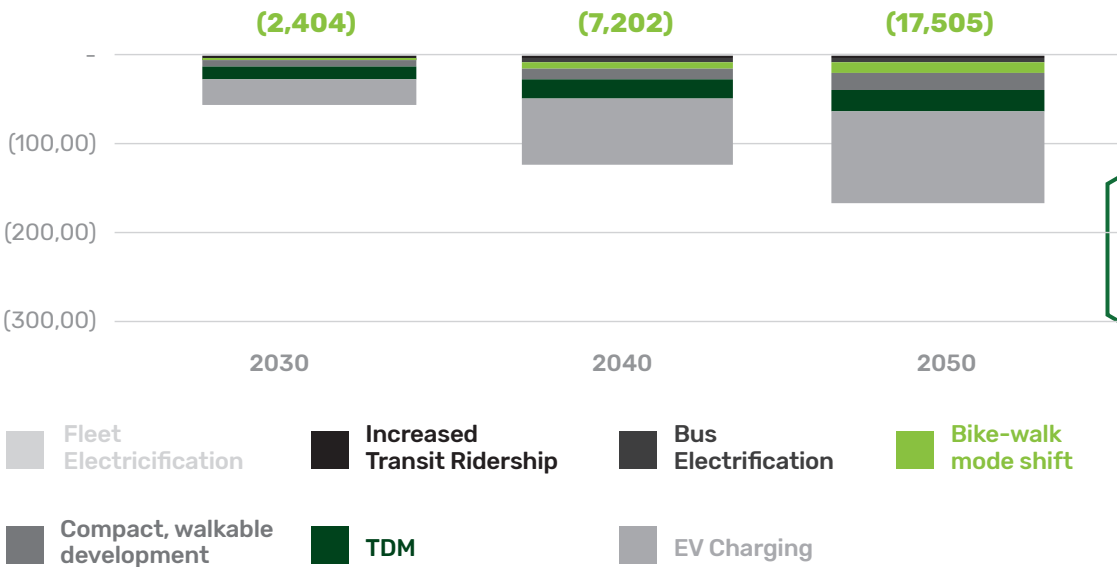
Costs vary by project for nearly 100 projects in the Mobility Plan, with some funded with federal, NCDOT and Town funding; others funded by Town Capital Improvement Program only



ACTION

Extend goals for increasing bicycling, walking, and transit activity (mode shift)

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO2e)



IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+	+	+
Potential Impacts	<ul style="list-style-type: none"> + Increased physical activity levels + Improved air quality 	<ul style="list-style-type: none"> + Decreased transportation costs + Better connectivity for all transportation modes + More transportation choices available 	<ul style="list-style-type: none"> + Regional trail linkages + Enhanced bike/ped connections to regional transit service + Regional transit linkages 	<ul style="list-style-type: none"> + Reduced dependencies on fossil fuels

Legend

- + Positive
- Neutral
- Negative



ACTION

Electrification of Municipal Fleet

The Town operates a fleet of vehicles to support the services it provides. Transitioning our fleet to more sustainable vehicle types is an important way for the Town to reduce our emissions. The Town has already made progress with moving towards alternative fuels, but a full transition to electric vehicles is the next step in achieving significant reductions.

Vision

Electrify all Town fleet passenger vehicles and light trucks by 2040

Strategies to electrify the Town’s fleet

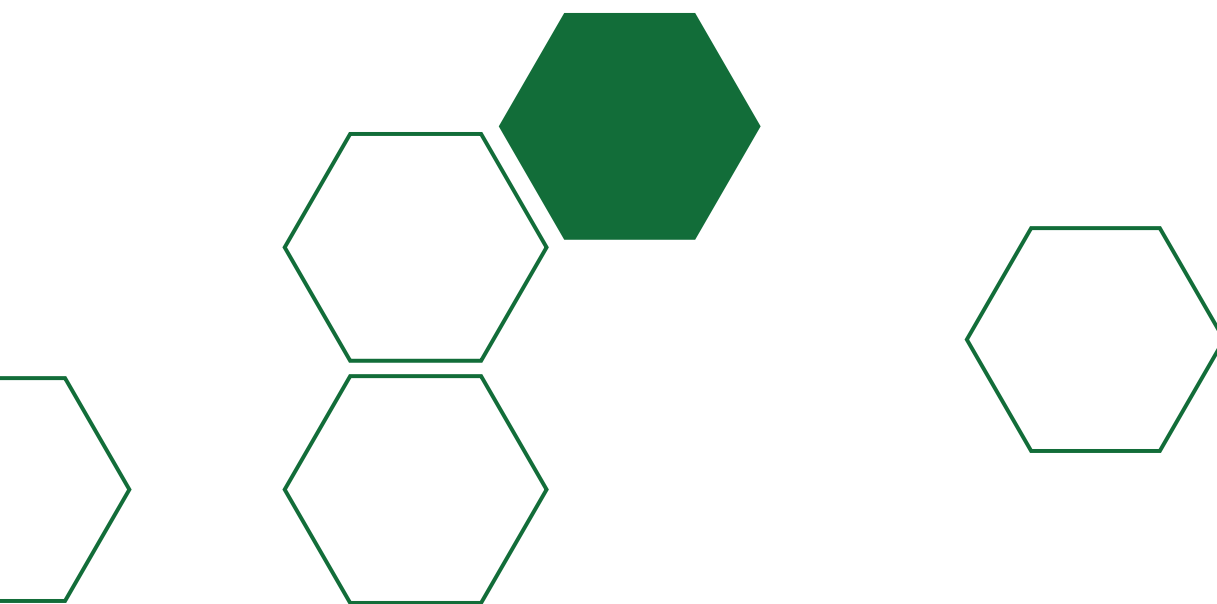
- Purchase electric vehicles as the fleet expands or turns over
- Prioritize replacement of higher emissions vehicles with zero or low emissions vehicles

Implementation Cost (Town):

\$450k estimated (\$10,000/vehicle) incremental costs of electric fleet vehicles (passenger and light duty trucks) over conventional vehicle purchases

WHAT IS THE TOWN DOING?

The Town’s fleet currently operates at 15% lower annual emissions than it did in 2005 because the Town has invested in fuel efficient vehicles and low-carbon fuels like biodiesel, E85, and electricity. In 2016, the Triangle Clean Cities Coalition recognized the Town with a Champion Level NC Smart Fleet designation.

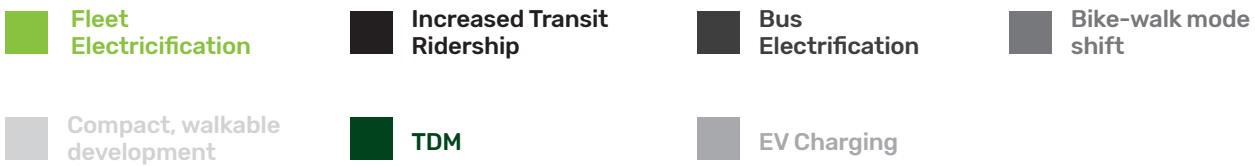
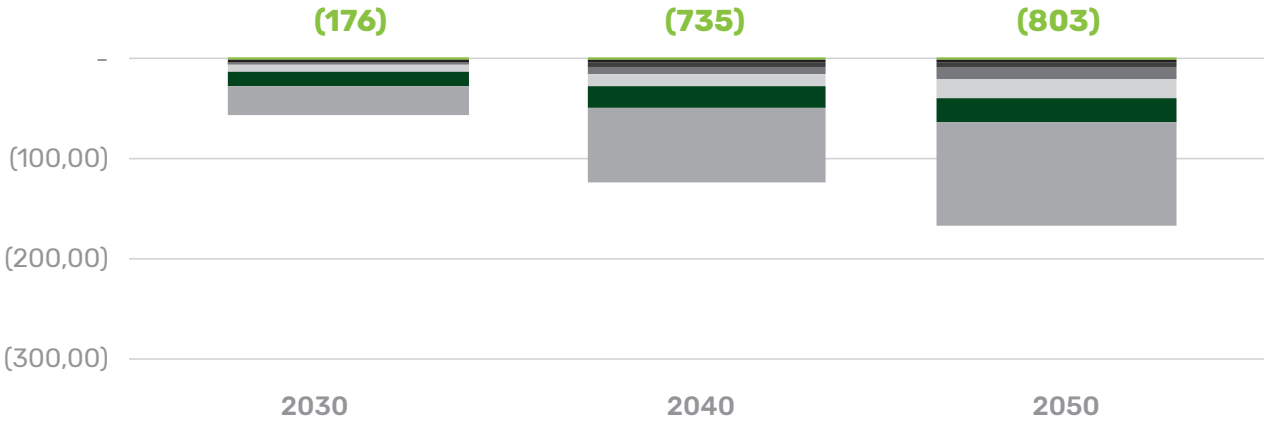




ACTION

Electrification of Municipal Fleet

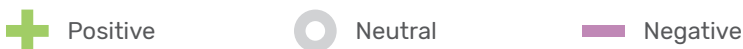
POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO2e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+	○	+
Potential Impacts	+ Improved air quality	+ Improved environmental conditions		+ Reduced dependence on fossil fuels

Legend





ACTION

Electrification of Transit Buses (Solar and Battery Backup)

Increasing transit is an important strategy for reducing the number of vehicles on the roads and the associated emissions. However, this strategy is less effective if transit buses have high emissions. Electric buses can significantly reduce emissions from the transit fleet.

Vision

Replace diesel buses with electric buses over the next 20 years, replacing the oldest, least fuel efficient buses first.

Strategies to electrify transit buses

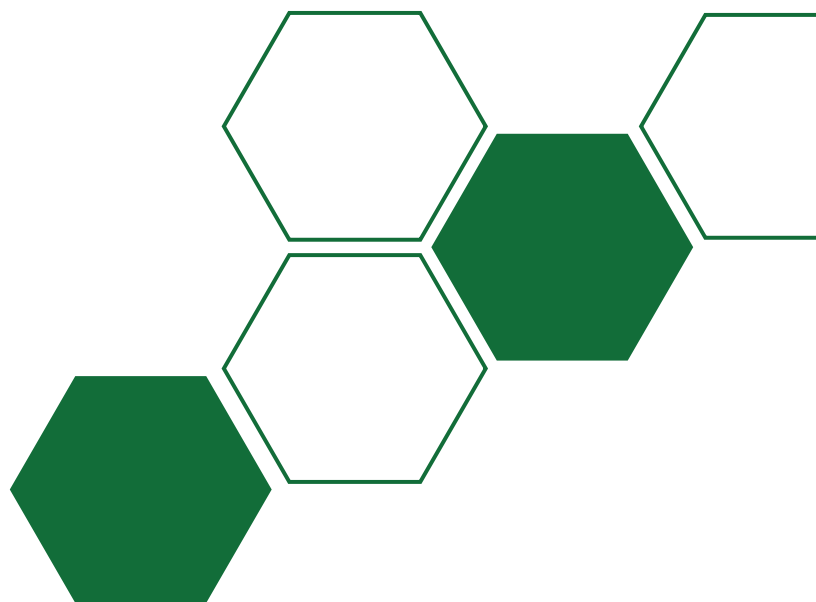
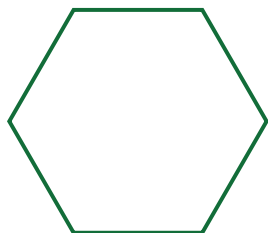
- Purchase electric buses
- Provide solar and battery backup
- Support electric buses with efficient charging infrastructure

WHAT IS THE TOWN DOING?

The Town’s transit fleet includes over 40 hybrid-electric buses, and funding has been secured over the last few years to purchase as many as 10 electric buses.

Implementation Cost (Town):

\$2.8M estimated incremental cost of electric buses over conventional bus purchases (\$270,000-\$300,000/bus for 10 buses)

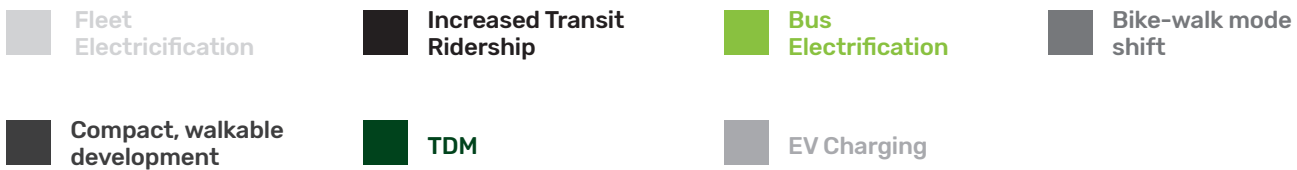
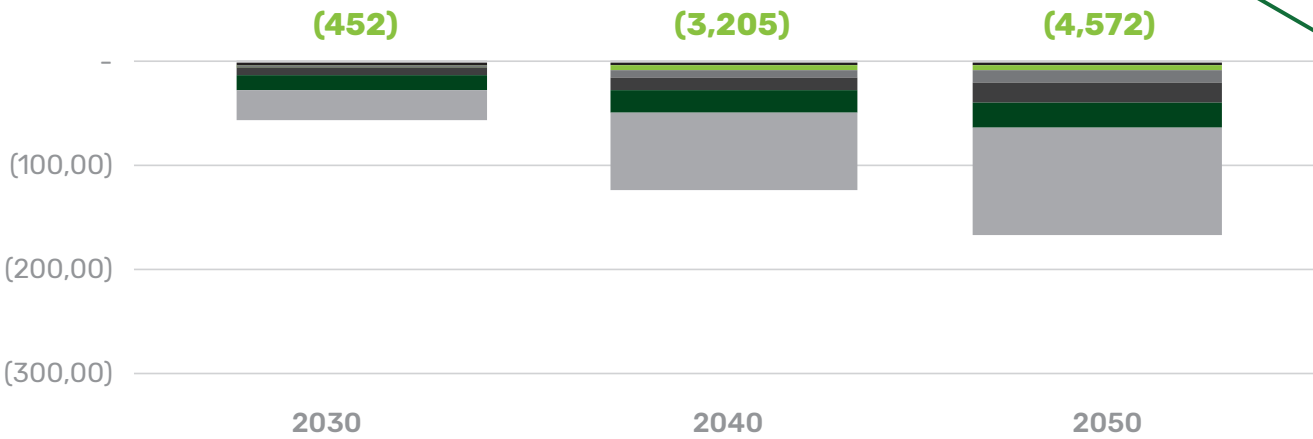




ACTION

Electrification of Transit Buses (Solar and Battery Backup)

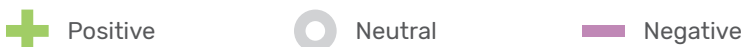
POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO2e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+	○	+
Potential Impacts	+ Improved air quality	+ Improved environmental conditions		+ Reduced dependence on fossil fuels

Legend





ACTION

Increase transit service and implement Bus Rapid Transit

Increased transit ridership helps to reduce GHGs from transportation. The Town has already adopted fare-free bus service to incentivize taking transit, a climate action best practice. Expanding the availability of fare-free bus service should continue to increase the use of transit within our community.

One key strategy for transitioning single occupancy, which creates dedicated bus lanes so bus operators can bypass traffic. BRT operates similarly to light rail systems. BRT is proposed for the North-South corridor, running along Martin Luther King, Jr. Boulevard (NC Highway 86), South Columbia Street, and US 15-501 South. Implementing BRT will complement other efforts to expand and improve transit service.

Vision

Expand transit service and implement the North-South BRT Corridor by 2040.

Strategies to promote walkable, compact development

- Continue to offer fare-free transit service
- Expand transit availability
- Implement BRT along the North-South Corridor

Implementation Cost (Town):

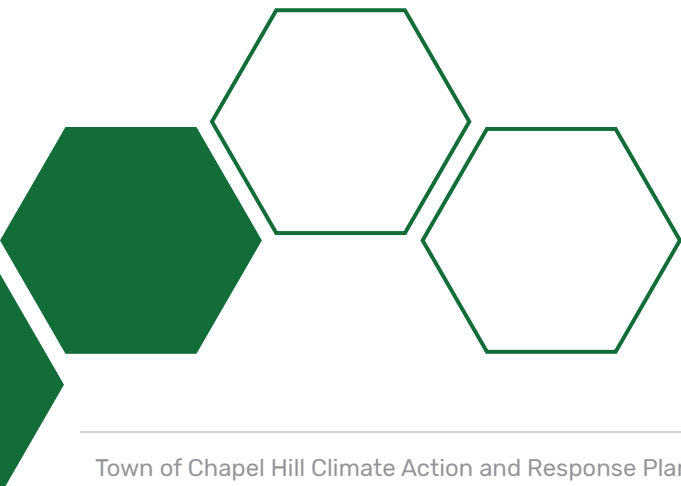
\$200M estimated cost for two BRT corridors

WHAT IS THE TOWN DOING?

Chapel Hill Transit provides more than 6.5 million fare-free rides per year. Since transitioning to fare-free service in 2002, it has become one of the largest fare-free systems in the United States.

WHAT IS BRT?

BRT is a strategy for transitioning single-occupancy vehicles to transit. It creates dedicated bus lanes so bus operators can bypass traffic. BRT operates similarly to light rail systems.

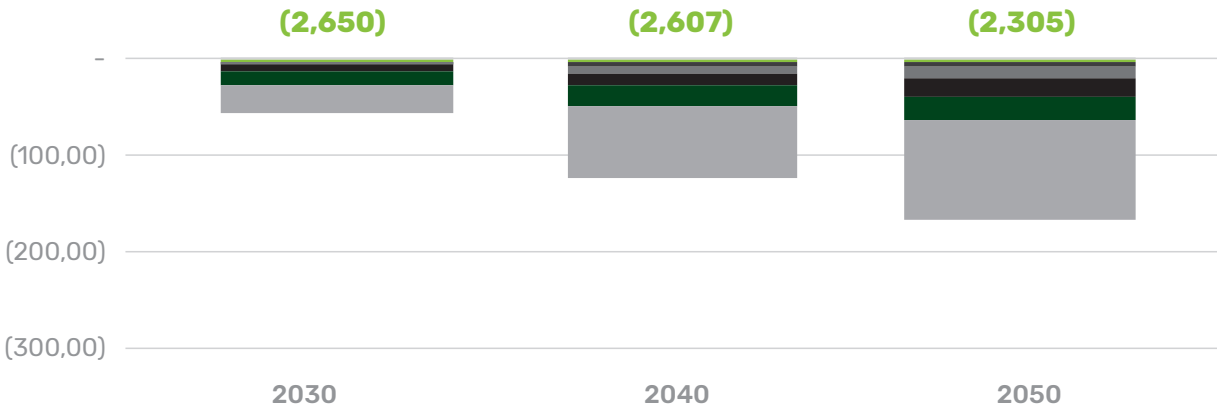




ACTION

Increase transit service and implement BRT

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO2e)



- Fleet Electrification
- Increased Transit Ridership
- Bus Electrification
- Bike-walk mode shift
- Compact, walkable development
- TDM
- EV Charging

OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	+	+
Potential Impacts	+ Improved air quality	+ Improved environmental conditions + Improved (fare-free) mobility	+ Potential for working with other regional transit providers and partners	+ Enhanced access to transit for weather emergencies and evacuation

Legend

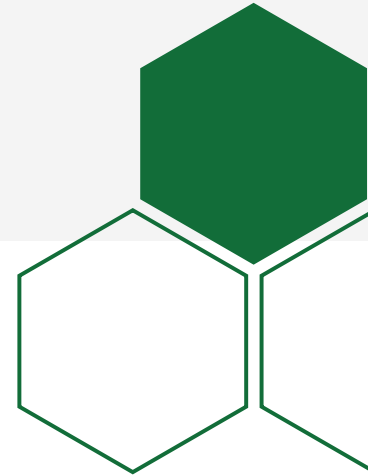
- + Positive
- Neutral
- Negative



ACTION

Electric Vehicle (EV) Charging

Limited charging infrastructure can be a deterrent to widespread adoption of electric vehicles (EV). Expanding charging infrastructure helps to support EVs and lower transportation emissions. Expanded EV charging infrastructure may also support the conversion of private and commercial fleets to electric vehicles.



Vision

Invest in Town EV charging infrastructure and encourage private sector development of workplace charging.

Strategies to promote walkable, compact development

- Install solar EV charging stations
- Incentivize or require charging stations for new construction
- Streamline process and reduce barriers to installing charging stations

Implementation Cost (Town/Private):

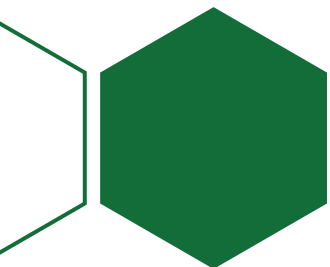
\$4.1M in public investment (629 Level 2 stations, 99 Level 3 stations); \$1.6M in private investment (761 workplace chargers) by 2050

WHAT IS THE TOWN DOING?

Chapel Hill is among North Carolina’s highest-ranking cities for residents with electric vehicles. There are more than 25 publicly available charging stations, including stations managed by the Town downtown and at the Aquatic Center.

WHO WITHIN OUR COMMUNITY CAN HELP?

- Regional government partners, including the State, County, and other local governments
- UNC-CH
- Non-profits
- Energy suppliers
- EV Charging suppliers

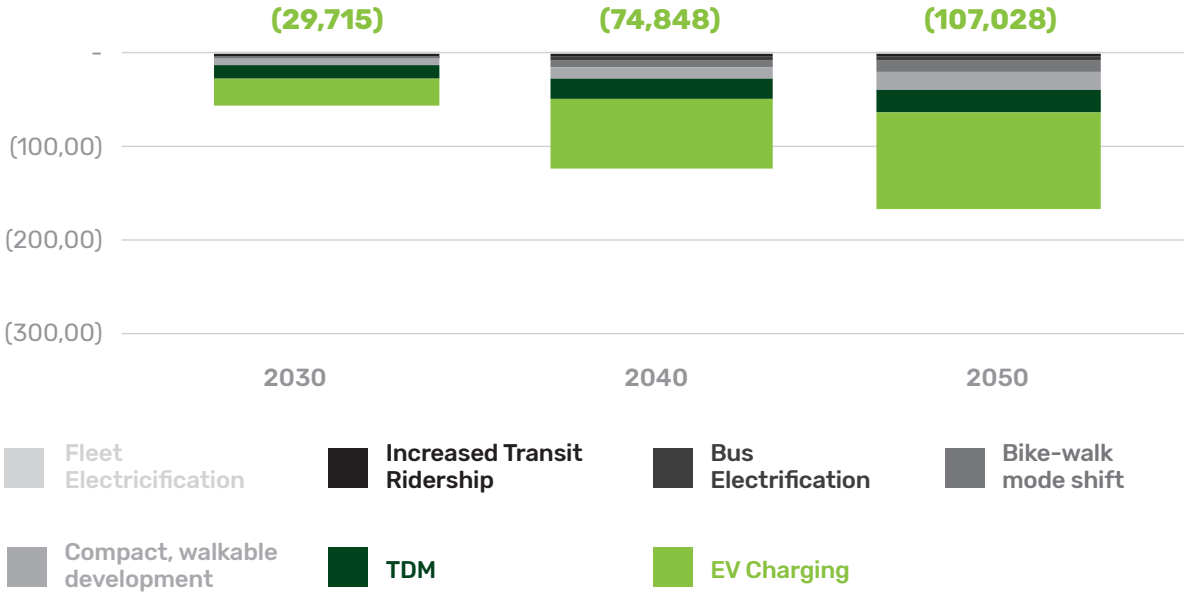




ACTION

Electric Vehicle (EV) Charging

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	+	+
Potential Impacts	+ Improved air quality	+ Improved environmental conditions • Location of and access to charging stations could create equity concerns if not managed	+ Opportunities to work to increase EV charging region-wide	+ Reduced dependence on fossil fuels

Legend

- + Positive
- Neutral
- Negative



ACTION

Expand Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is focused on understanding how people make transportation decisions and helping them to choose alternatives to driving for work commuting and other trips. TDM provides support for a wide range of alternatives to driving in order to reduce the overall number of cars on the road, especially during peak travel times. Transportation alternatives for TDM include transit, ridesharing, walking, bicycling, telework, and flexible or alternative work schedules.

Vision

Increase the share of telework to at least 20–30% by 2040.

TDM Strategies

- Develop partnerships with employers to support telecommuting and alternative commute options
- Promote and encourage transportation alternatives
- Provide incentives for choosing transportation options other than driving

Implementation Cost (Town) :

Some increased costs for expanded TDM program, activities, and staff

WHAT IS THE TOWN DOING?

The Town’s Commute Alternative Program offers resources and encouragement for anyone wanting to try one. The Town has established partnerships and sponsors events to encourage commute alternatives.

WHO WITHIN OUR COMMUNITY CAN HELP?

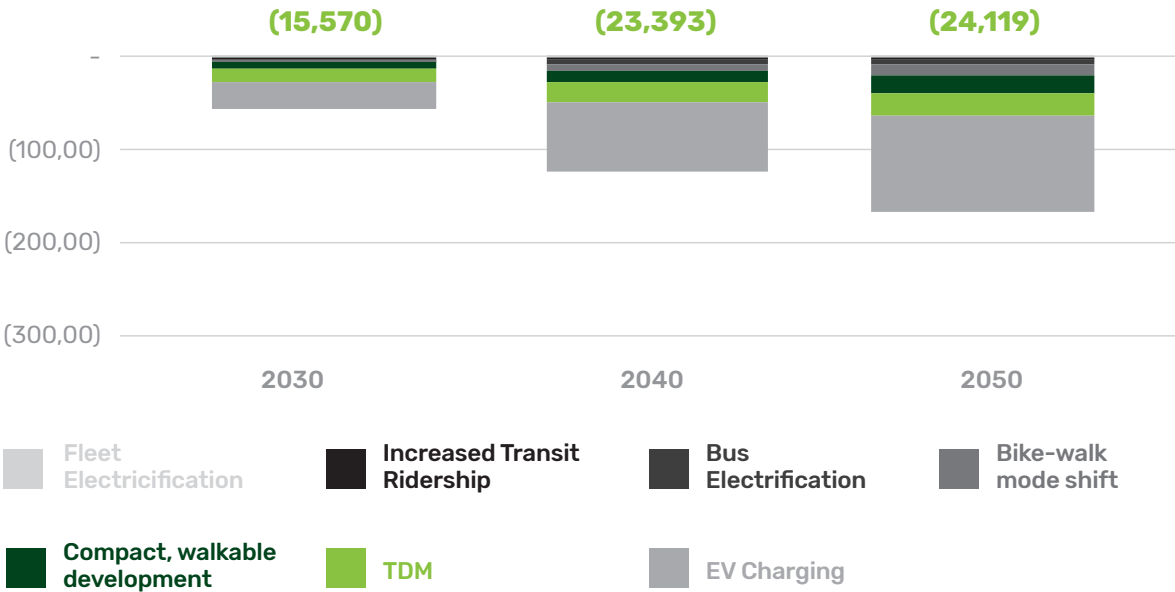
- Employers
- Individuals



ACTION

Expand Transportation Demand Management (TDM)

POTENTIAL REDUCTION IN GREENHOUSE GAS EMISSIONS (MTCO₂e)



OTHER BENEFITS

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / -	+	○
Potential Impacts	+ Improved air quality	+ Improved environmental conditions + Possible increase in transportation options	+ Collaborate to expand regional TDM efforts	

Legend

- + Positive
- Neutral
- Negative

Waste, Water, & Other

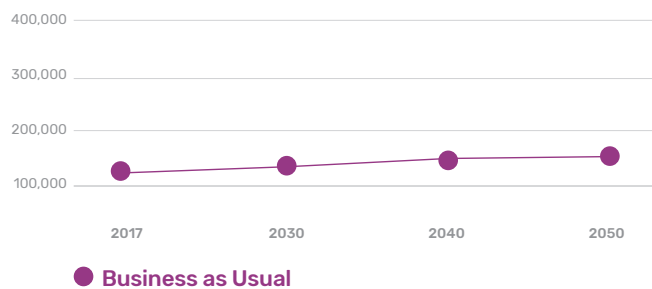


OVERVIEW

Greenhouse gas emissions come from many sources, including waste and wastewater processing, which make up about 5% of all emissions in Chapel Hill. Climate actions and responses are not limited to reducing energy use or finding cleaner sources of energy. Protecting the natural environment can help our community be more resilient to climate change. There are many ways our community can work together to use our resources more wisely and protect our natural environment.

Current Greenhouse Gas Emissions from Waste, Water, and Other Sources

Existing and Forecast GHGs from Waste, Wastewater and Water - "Business as Usual" (MTCO₂e)



Top Waste, Water, and Other Actions

TOWN ACTIONS	COMMUNITY ACTIONS
Protect water quality, natural and agricultural resources	Zero Waste

Waste, Water and Other Metrics

INDICATOR	MEASURE(S)	HOW/WHY WE MEASURE
Reduction in GHGs for waste, wastewater, etc sector	MTCO ₂ e by sector	Meeting our GHG reduction goals requires realizing reductions in all sectors.
Solid waste diverted from landfill (recycling, composting, etc.)	Tons	Reductions in landfill waste lead to reductions in GHG.
Surface water quality meets applicable NC Water Quality Standards	Yes/No	Pollutants, including GHG emissions, degrade water quality. Vegetation in wetlands and water bodies can improve water quality and lower GHG emissions.



ACTION

Zero Waste

Zero waste means being thoughtful about how we use our resources, with the aim of eliminating waste without environmental discharges. It begins with how we obtain resources and design products and ends with how we dispose of them. A zero waste community uses the things that might otherwise be discarded.

Strategies to reach zero waste

- Increase composting for homes and businesses
- Encourage waste reduction
- Encourage using less
- Choose reusable (including reusable bottles for household products, reusable cups, reusable shopping bags, etc.)
- Choose compostable products for one-use items
- Consider biodigesters at universities or other appropriate facilities
- Expand education

Implementation Cost (Town) :

Costs TBD based on Zero Waste strategies implemented

WHAT IS THE TOWN DOING?

Orange County is leading an effort through the Solid Waste Advisory Group to develop a master plan for solid waste that includes a zero-waste goal for the community. The plan will define program costs for reaching a zero-waste goal.

WHO WITHIN OUR COMMUNITY CAN HELP?

- Waste management and related companies
- Businesses and restaurants
- Event organizers
- Schools and universities
- Non-profits
- Individuals



ACTION

Zero Waste

IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+ / ○	+	○
Potential Impacts	<ul style="list-style-type: none"> + Reduced waste + Reduced environmental toxins + Healthy soils support growth of healthy foods 	<ul style="list-style-type: none"> + Growth in green jobs + Supports local economies + Less use of resources • Education and resource availability will affect equity of zero waste programs 	<ul style="list-style-type: none"> + Potential for regional zero waste and green jobs efforts 	

Legend

- + Positive
- Neutral
- Negative



ACTION

Protect Water Quality, Natural and Agricultural Resources

Protecting our natural environment can support our community’s resilience to climate change and natural hazards. Agricultural lands provide some of the benefits of natural habitats and provide local food sources. High quality waters support our water supply, support natural habitats, and provide recreational opportunities. Water conservation and stormwater management are important ways to keep our water supply clean, healthy, and abundant.

Strategies to protect water quality and natural and agricultural resources

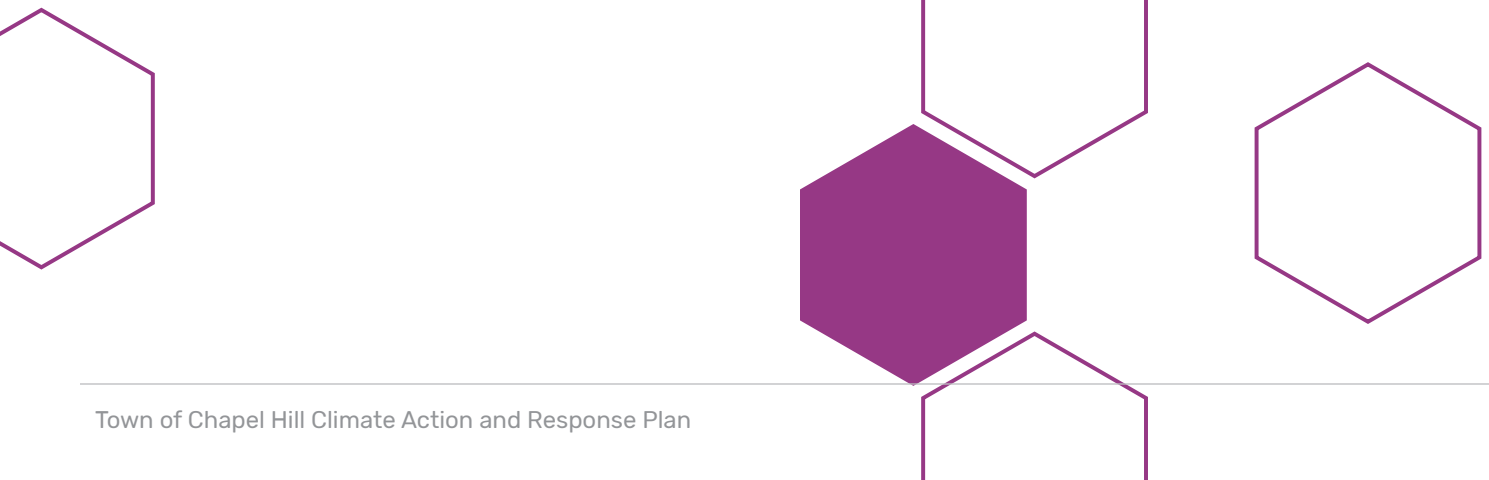
- Preserve and protect natural and agricultural lands
- Improve stormwater management
- Encourage rainwater harvesting for non-potable water demands
- Encourage on-campus residence halls to inform residents of their water usage
- Develop maintenance strategies for stormwater controls

WHO WITHIN OUR COMMUNITY CAN HELP?

- Schools and universities
- Community and civic organizations
- Agriculture organizations
- Businesses and business organizations
- Non-profits

Implementation Cost (Town) :

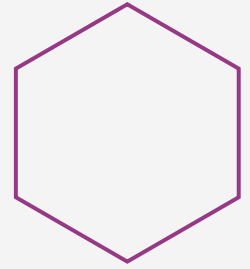
Costs TBD based on Town investments as identified





ACTION

Protect Water Quality, Natural and Agricultural Resources



IMPACT CATEGORY	PUBLIC HEALTH	EQUITY / CLIMATE JUSTICE	REGIONAL PARTNERSHIP POTENTIAL	RESILIENCE TO STRESSORS
Level of Impact	+	+	+	+
Potential Impacts	<ul style="list-style-type: none"> + Improved water quality + Improved access to local foods 	<ul style="list-style-type: none"> + Growth in green jobs + Reduced flooding risk from stormwater management 	<ul style="list-style-type: none"> + Potential for regional conservation efforts 	<ul style="list-style-type: none"> + Increased ecosystem and habitat resilience + Reduced flooding risk

Legend

- + Positive
- Neutral
- Negative

Resiliency

OVERVIEW

Resiliency is the ability of an individual or a system such as a family, business, or community to successfully respond to disruptions and adapt to changes. Community climate resilience means that we can anticipate, prepare for, and respond to hazardous events and other consequences of a changing climate. Resilience strategies are not focused on reducing GHGs, but on adapting to the changes that we are experiencing as a result of them. They include a wide range of actions, such as improving stormwater management, reducing the risk of heat impacts, building community organizational capacity and resources, and emergency response planning. Planning for resilience includes thinking about the people who have higher risk levels for various threats and prioritizing their safety and wellbeing.



As communities prepare to become climate resilient, they are seizing the opportunity to build general resilience through more holistic approaches. This involves integrated resilience planning for our energy, transportation, housing, food, water, social capital, health systems and infrastructure. In this way, our community can be prepared to “bounce forward” by building broad general resilience rather than simply preparing to recover or “bounce back” from climate change impacts.

PLANNING FOR RESILIENCE AT THE REGIONAL LEVEL

The Triangle Regional Resilience Assessment (TRRA) (October 2018) was a regional effort to identify climate challenges and stressors and prioritize strategies to build resilience. The Town of Chapel Hill participated in a cooperative partnership with other communities in the region to develop the TRRA. While many of the issues can be more effectively addressed at the regional level, the TRRA shaped the Town’s resilience strategies and informed the identification of stressors.

CLIMATE EQUITY

Social equity ensures all community members can access opportunities and resources necessary to meet their needs, support their wellbeing, and achieve their potential. Climate equity ensures everyone benefits from climate solutions, and no one takes on more of the burden of climate impacts. This requires intentional efforts to change the systems and structures that worsen climate change and inequality.

Top Resiliency Actions

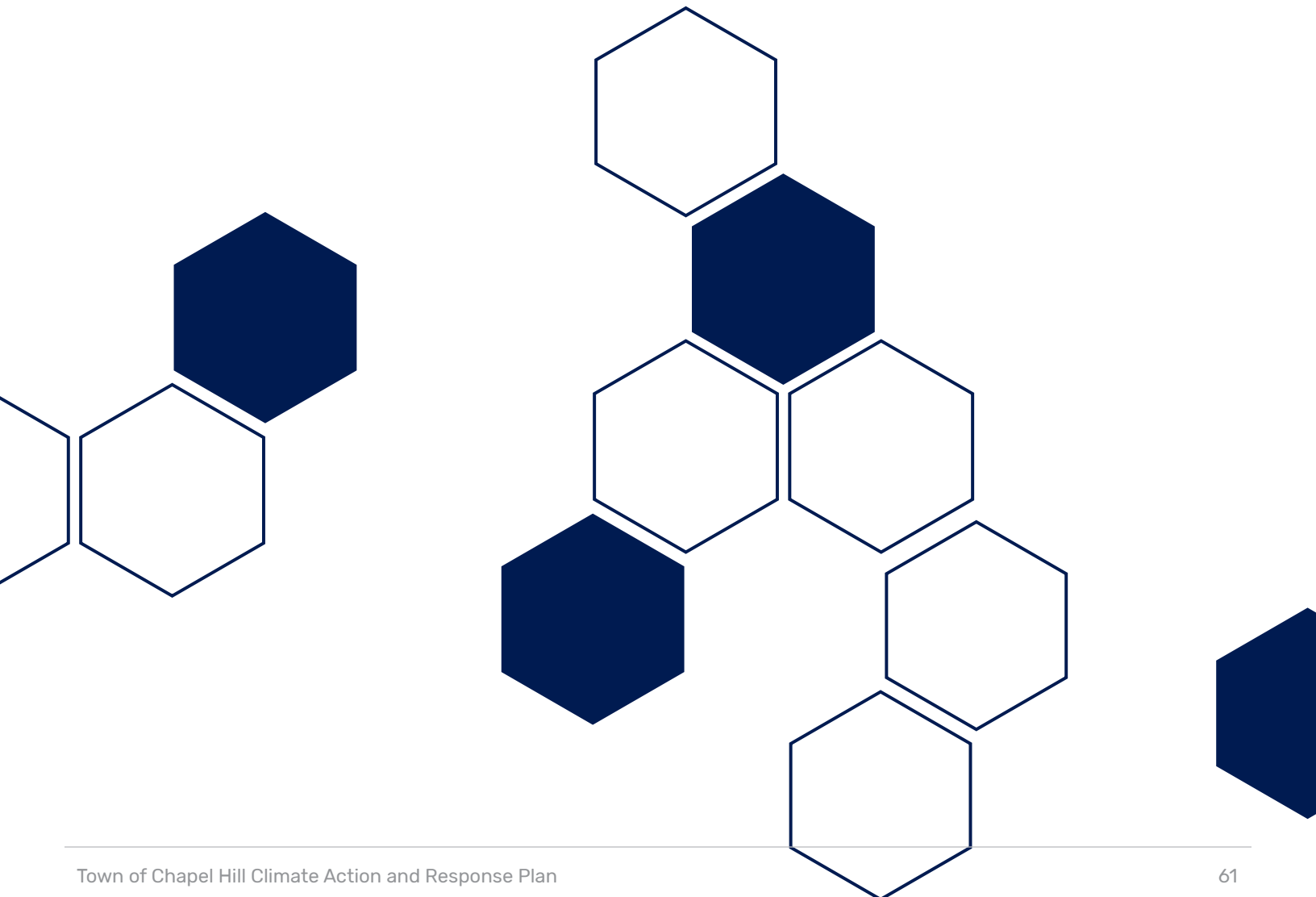
TOWN ACTIONS	COMMUNITY ACTIONS
Early warning systems for climate hazards and heat	Climate action education, outreach, and awareness
Tree/ open space protection	Partnerships, funding, and incentives
	Other strategies improve resiliency and recovery



Resiliency

Resiliency and Recovery Metrics

INDICATOR	MEASURE(S)	HOW/WHY WE MEASURE
Time to recovery after a catastrophic event	Months	Speed of recovery after an event such as a flood or hurricane is an indicator of how resilient a community is.
Average Income	\$	Higher incomes and higher diversity of income sources indicate a more resilient population with higher capacity to recover
Access to food/basic services	Percent of population and employment within 0.4 miles of transit	Transit accessibility is one way to assess whether the population is able to access food and basic services. A high degree of access means the population is more likely to be resilient to stress.

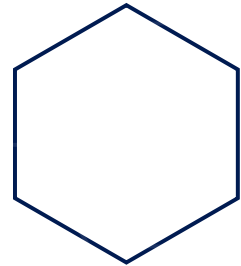




ACTION

Early Warning Systems for Climate Hazards and Heat

Early warning systems can help people know when hazards are imminent, allowing them to appropriately prepare and respond. The Triangle Regional Resilience Assessment identified a strategy for developing flood early warning systems with gauges in strategic locations to let people know when to evacuate, as well as providing information on road closures. The Town may also develop early warning systems for other hazards, like extreme heat, which would let people know when to take precautions to avoid heat.



Warning Systems May Include

- Connecting streaming data sources to create real-time data
- Predictions of road closures and other responses
- Making data readily available through mapping, apps, flood gauges, warning signs, etc.

Cost of Implementation:

Costs TBD based on systems considered

ACTION

Green Infrastructure

VISION

Plant 200 or more canopy trees every year and enact a new green infrastructure ordinance by 2022.

Trees and green spaces can help to mitigate heat effects. Trees provide shade, and open spaces reduce the amount of paved surfaces that increase heat. Vegetation also helps with water filtration and non-paved areas allow water to soak into the ground, reducing runoff. Green infrastructure also provides critical habitat and ecosystem service benefits.

Cost of Implementation:

Costs TBD based on Town investments as identified





ACTION

Climate Action Education, Outreach, and Awareness

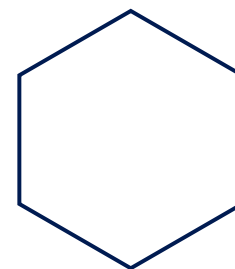
Education, outreach and awareness can help equip our community to understand why climate action and response are important and how it can take action. Our community has expressed the importance of sustainability literacy for children, adults, and businesses. The Town, schools, community and civic organizations can work together to deliver constructive and collaborative educational programs and outreach to increase participation in climate actions.

Potential Climate Education Topics

- The importance of climate action
- Public transportation benefits
- Anti-idling
- How individual and business actions impact climate
- Economic benefits and values of climate actions
- Importance of transportation and land use connections to climate
- Composting
- How to reduce waste and why it's important
- Recycling
- How to reduce runoff and manage water use
- Rain gardens and stormwater
- Sharing best practices
- How to reduce runoff and manage water use
- Training for green jobs

Cost of Implementation:

Some increased costs for expanded sustainability and climate-related programs, activities, and staff





ACTION

Partnerships, Funding, and Incentives

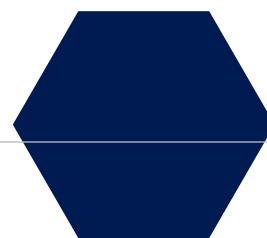
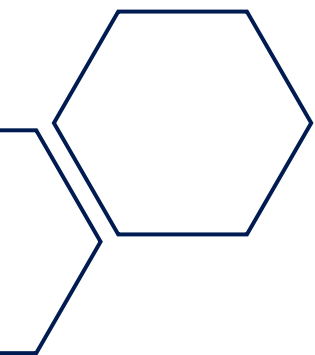
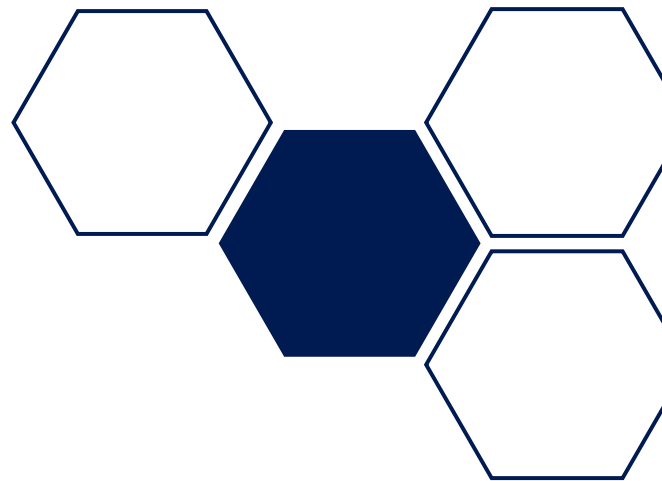
Making progress on climate action and response as a community will require a variety of resources. Partnerships among the town, institutions, businesses, and other local organizations are necessary for taking action together. Funding sources must be identified, and climate actions should be incentivized to encourage maximum participation.

Strategies for building partnerships, securing funding, and providing incentives

- Strengthen partnerships for disaster response
- Declare a climate emergency to build support for funding
- Pursue mitigation grants
- Support state and regional efforts, such as the State natural and working lands action plan
- Start a water fund to protect upstream water quality
- Provide tax incentives for land preservation in flood plains
- Encourage competition based on audits of building efficiency for homes and businesses
- Provide funding for retrofits and health care for people with low wealth

Cost of Implementation:

Cost range TBD based on specific Town activities





ACTION

Other Community-wide Resilience and Recovery Actions

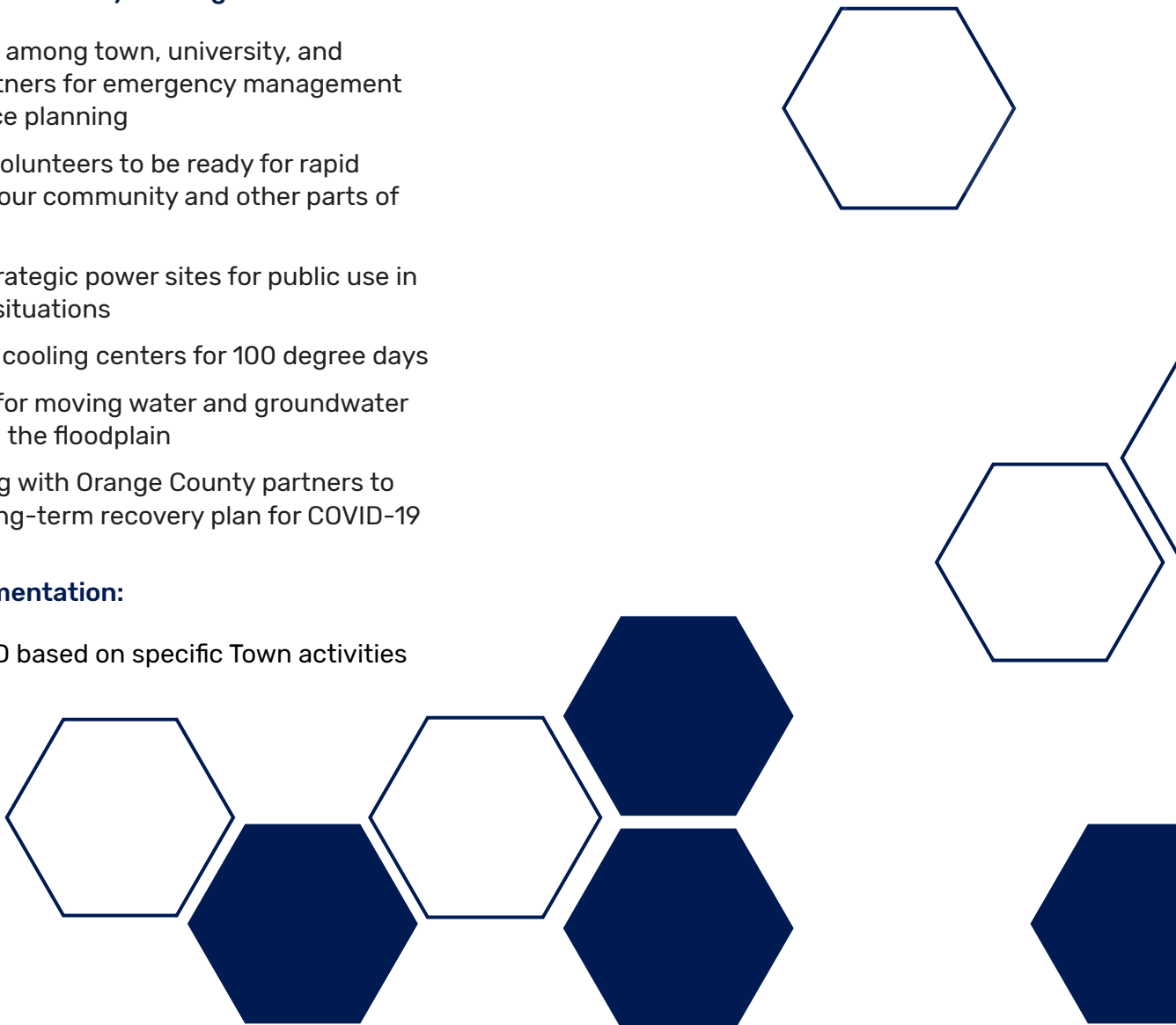
Our community can implement a variety of strategies to improve resilience.

Resilience and Recovery Strategies Include:

- Cooperating among town, university, and regional partners for emergency management and resilience planning
- Organizing volunteers to be ready for rapid response in our community and other parts of the state
- Providing strategic power sites for public use in emergency situations
- Designating cooling centers for 100 degree days
- Advocating for moving water and groundwater threats from the floodplain
- Collaborating with Orange County partners to develop a long-term recovery plan for COVID-19

Cost of Implementation:

Cost range TBD based on specific Town activities

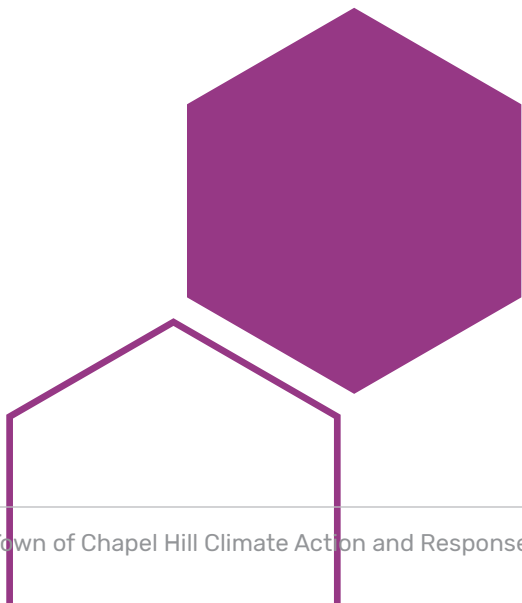


Implementation and Next Steps

Our Climate Action and Response Plan lays a framework for the Chapel Hill community to take action together to meet our climate goals. Now the real work begins.

Our Town leadership has committed several key strategies already. To achieve racial equity and advance opportunities for all, we will work directly with historically marginalized communities to design and implement climate actions that are meaningful and impactful to everyone who lives here. In the coming years, our climate goals and the key actions identified will be a guiding principle in municipal decision-making. To advance racial equity in Chapel Hill, we will work directly with historically underrepresented groups with the goal of taking action that is meaningful and impactful to everyone who lives here.

The planning process set the foundation for future partnerships among the Town, businesses, institutions, and civic organizations across Chapel Hill. Continuing to strengthen these relationships and work together towards climate goals is the cornerstone for our future success. We have the knowledge, relationships, and the tools we need to support climate actions throughout our community. Now it's up to all of us to stay committed, work together, and put our ideas in action.



Timeframe for Full Climate Action Plan Implementation

2020

CARP drafted

2021

CARP adopted, implementation begins

2022

2023

2025

- 11 fleet vehicles electrified
- MSC replaces 4 municipal buildings
- 40% of new const. all electric
- New const. halfway to net zero
- 50% of new const. is net zero
- Replace 10 buses with electric
- Bus rapid transit online

** MSC = municipal service center, designed to meet AIA 2030 Challenge*

2030

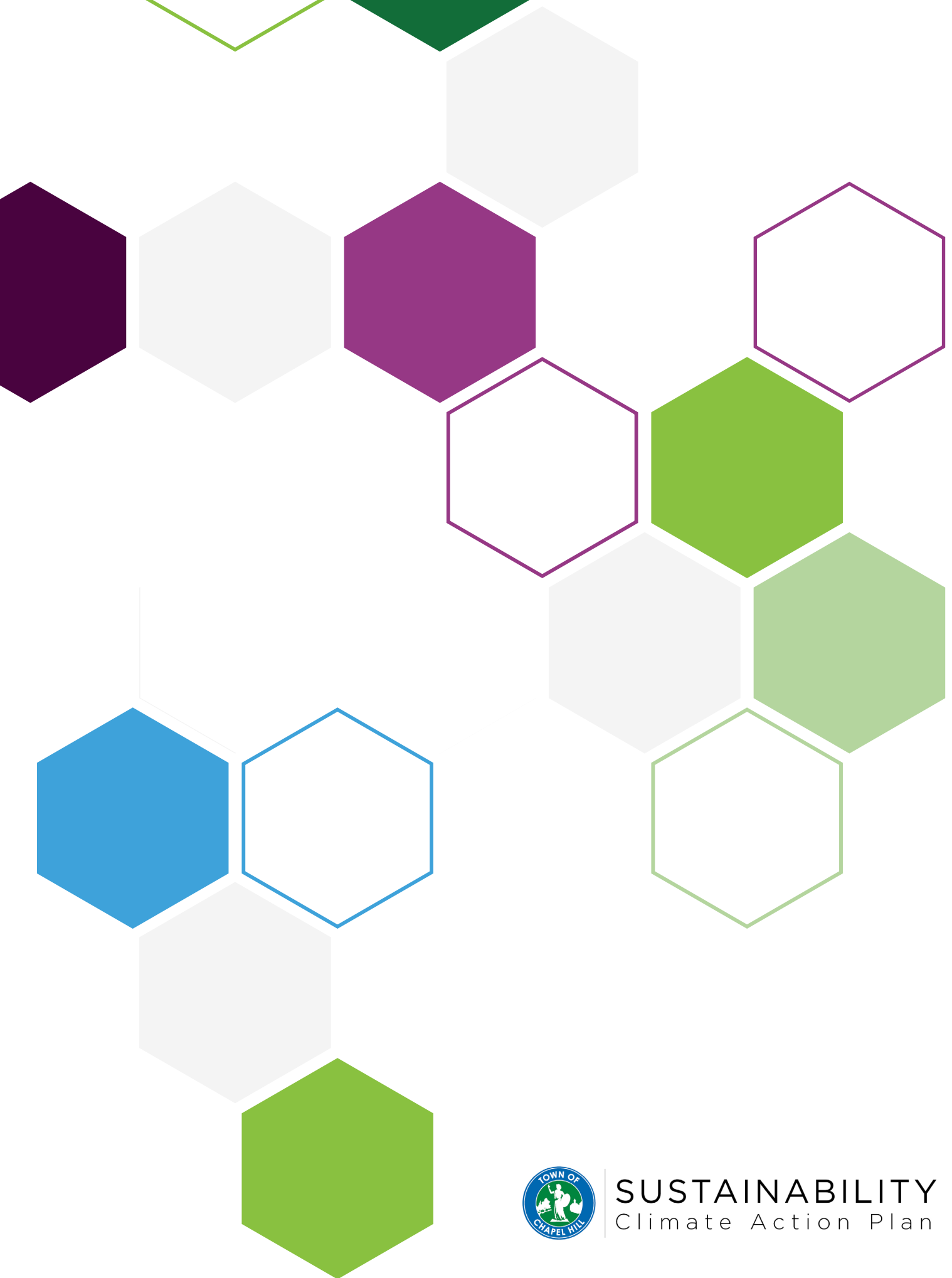
- 100% of new const. all electric
- 100% new const. net zero
- Half of Town facilities 50% net zero
- 10% of residential is 50% net zero
- 5% of comm. is 50% net zero
- 11,151 electric vehicles
- 22 fleet vehicles electrified

2040

- 10% reduction in vehicle miles
- 20% of residential is 50% net zero
- 10% of commercial is 50% net zero
- 25,371 electric vehicles
- 48 fleet vehicles electrified

2050

- Net Zero
- 100% of buildings all electric
- 30% of residential is 50% net zero
- 15% of commercial is 50% net zero
- Duke Energy + Dominion carbon neutral
- 33% of car travel to walk/bike/bus



SUSTAINABILITY
Climate Action Plan