



## CHAPTER SIX

# Green Stormwater Infrastructure, Water, & Energy

### GREEN STORMWATER INFRASTRUCTURE - VISION

Carrboro routinely prioritizes green infrastructure over grey infrastructure, throughout the Town and Planning Jurisdiction, to enhance ecosystems and improve vibrancy, quality of life, and stormwater resiliency in the community.

### GREEN STORMWATER INFRASTRUCTURE - KEY FINDINGS

1. Protecting terrestrial and aquatic ecosystems, responsible development, and providing citizens with access to nature are priorities for Carrboro. Green infrastructure refers to the nature-based approaches to realizing these priorities. It includes the intentional means to plan and implement strategies that ensure that native plan communities are created, protected, and restored to thrive. Several initiatives have been recently completed or are underway to improve access to and traveling through existing trails and greenways. These include the Jones Creek Greenway, Homestead-CHHS Multi-use path, and Morgan Creek Greenway. Two greenways, Jones Creek and Morgan Creek, are currently being funded in the CIP budget (the CIP budget dedicates \$1,987,500, with federal monies funding 80% of that value, to the development of greenways along Jones and Morgan Creek)
2. Green stormwater infrastructure is a specific type of green infrastructure that focuses on treating the runoff from developed areas with nature-based practices such as rain gardens, wetlands, bioswales, and other measures that more closely mimic how nature operates than many of the more "traditional" grey infrastructure approaches to stormwater management. Carrboro is actively working on identifying and expanding opportunities to educate and assist residents in implementing green stormwater infrastructure on their private properties. In 2020, the Town supported a study that was driven by flood related concerns in the upper Toms Creek watershed and included a recommendation to pilot a green infrastructure-based residential assistance program.

### GREEN STORMWATER INFRASTRUCTURE - DRAFT METRICS:

1. Increase residential participation in native planting by xx%.
2. Increase tree canopy coverage by xx%.
3. XX residents engaged in RainReady Initiative to reduce residential flooding.

**Goal 1: Increase the use of native plants and vegetation to mitigate climate change impacts, including stormwater mitigation and heat island effect.**

**Strategy 1.1:** Rely on community leadership and participation from all residents, including those with financial barriers or that have historically been excluded from participation.

Marginalized residents are typically on the frontlines of feeling climate change impacts. Work with these residents to understand if and how they are disproportionately impacted by climate change impacts to then understand how to use green infrastructure to improve their life experiences and financial burdens.

**Projects:**

- a) Support the formation of a community-led urban forestry program for the preservation, protection, and conservation of the community forest (CCAP 2020).

Increase public awareness of the value of trees. Provide oversight for a community scale urban forestry program that seeks to preserve and protect the community forest. Partner with civic groups to improve and expand the Town's tree canopy.

- b) Increase public education of the benefits of native plants and vegetation for stormwater management (NDPES PHASE II).

Educate the public about the difference between turf lawns and native plants in terms of stormwater management. Native plants have deeper roots which can slow down rainwater runoff which reduces stormwater flooding.

- c) Pursue regulatory and non-regulatory approaches to discourage non-native and invasive plants and encourage native plant use (CCAP 2017).

Encourage naturalized landscaping instead of manicured lawns which require less fertilizers and pesticides and can also reduce heat island effect. Look at the Bolin Forest and Quarterpath Trace neighborhoods' initiatives with regard to urban forest stewardship to discourage non-native/invasive plant use.

- d) Identify opportunities to promote technical assistance and cost-share grant program to residents seeking (RainReady Carrboro, 2020) to abide by regulatory approaches for encouraging native plant use.

- e) Identify local resident "champions" who can partner with the Town to support the development of the program and serve as a liaison to residents (RainReady Carrboro, 2020)

- f) Identify program design options that provide financial support enabling low-income residents' participation in a technical assistance and cost-share grant program to install green infrastructure (RainReady Carrboro, 2020).



Create a baseline for downtown street trees. Develop priority streets with community and stakeholder engagement, incorporate urban heat island data. Allocate budget for installing street planters and culturally and ecologically appropriate trees.

- b) Make the 2019 “tree tag” outreach an ongoing and regular initiative.

The tree tag project identified trees and shared how each tree provided financial savings, avoided stormwater runoff, saved electricity and energy, and stored carbon dioxide. This initiative should be expanded past current reach and is an example of a successful public education campaign.

- c) Work with downtown businesses and residents to improve the canopy on private lots.
- d) Seek grant support from the State and other sources to provide financial and technical support.

Allocate staff time to research funding opportunities for increasing the tree canopy.

**Strategy 2.2:** Work with neighborhoods to improve tree canopy and the forest along roads, in neighborhood open spaces, and on private lots.



Tree canopy coverage provides shade for users while reducing the heat island effect and reduce stormwater runoff.

**Projects:**

- a) Support neighborhood efforts to pursue grant funds for neighborhood improvements, especially those with ecological value or related to other town priorities.

- b) Provide criteria for neighborhood street tree inventories and related master plans.
- c) Work at a neighborhood scale to “green” the public right-of-way.
  
- d) Provide technical assistance for individual residents' improvement and expansion of tree canopy.

Provide workshops, trainings, and a resource center (virtual or physical) to educate residents on how to expand the tree canopy on their own property.

- e) Seek grant support from the State and other sources to provide financial and technical support.

**Goal 3: Expand green infrastructure as part of stormwater, watershed restoration, and climate resilience efforts into the Town’s public transportation investments.**

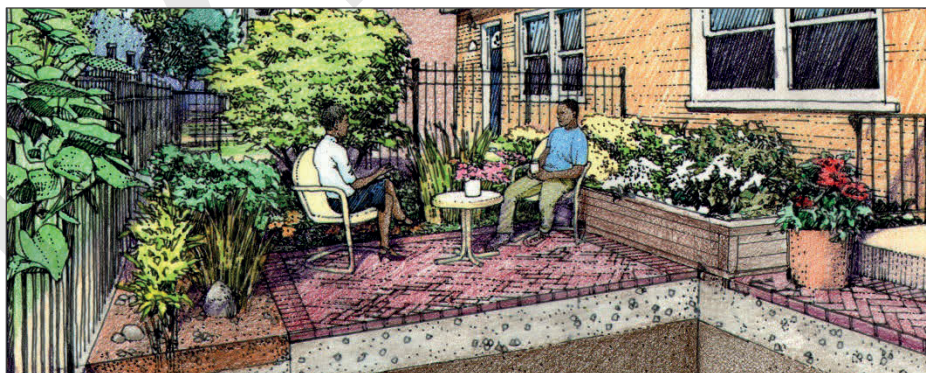
**Strategy 3.1:** Coordinate transportation and public infrastructure improvements with green stormwater infrastructure.

**Projects:**

- a) Integrate green stormwater infrastructure dual solutions that improve stormwater management practices and traffic calming in transportation infrastructure (streets, alleys, sidewalks, curbs, storm sewers, and greenways).

Example solutions include street planters and permeable pavement which will slow down rainwater runoff. Street planters can be installed in sidewalks or medians and are large concrete boxes with soil that allow for plant growth and include gravel for rainwater storage. Permeable pavement are areas filled with gravel and covered by porous pavement to allow water to travel through.

Permeable Pavement



Examples of green stormwater infrastructure.

Permeable Pavement & Bioretention Bump Outs



Tree planters with Stormwater Filtration



Riparian/Stream Repair/Restoration Projects



Impervious Removal and Disconnection



- b) Residents, especially BIPOC identities, provide feedback on transportation plan's incorporation of green infrastructure (Bolin Creek Greenway Conceptual Master Plan, 2009).

Always include residents, especially those of marginalized identities, in the planning of transportation plans to ensure that their mobility needs are accounted for and that they also understand the dual benefits of green infrastructure.

- c) Educate residents about the Town's definition of a greenway and its benefits, and foster discussion about greenways (Community Meeting 2020).

**Callout Box:** Greenways Commission Charge for Greenways: Unbroken chains of preserved open space surrounding stream and wildlife corridors, headwaters, water recharge areas, and significant ecosystems that also provide bicycle and pedestrian connections between neighborhoods and for the community.

#### **Goal 4: Expand green stormwater infrastructure as part of watershed restoration and climate resilience efforts (hydrology).**

**Strategy 4.1:** Expand access to retrofit existing stormwater infrastructure and add new green stormwater infrastructure on private property for greater lot, neighborhood, and watershed scale resilience and environmental quality as well as community enjoyment of outdoor spaces.

##### **Projects:**

- a) Develop programming and accompanying financial assistance for income-eligible households to install green stormwater infrastructure (RainReady Carrboro, 2020).

Installing green stormwater infrastructure can be expensive. Identifying funding and financing opportunities so that low-income households can also participate and install green stormwater infrastructure.

- b) Develop a playbook for stormwater infrastructure retrofits to educate the public.

Identify partners experts who can help develop and deliver typologies of retrofits with the highest likelihood of widespread adoption. Develop public education campaign to publicize playbook and how-to on implementing retrofits. Provide technical assistance for retrofit projects.



## WATER - VISION

Pursue a “One Water” vision in which water is managed in a sustainable and inclusive manner to build a better quality of life for everyone and a healthier environment. Align diverse stakeholders to find common ground solutions to the most pressing water challenges. Current and future generations of Carrboro residents, especially BIPOC populations, reliably enjoy affordable access to high quality drinking water, while improving healthy environments and aquatic ecosystems for Carrboro wildlife.

## WATER - KEY FINDINGS

1. OWASA is continuously working towards maintaining a sustainable water supply, particularly one that is affordable for its lower income residents.
2. The Town has been involved in efforts to protect and restore the creeks in Carrboro as well as downstream waters for many years through land use regulations, watershed protection and restoration plans, and an EPA National Pollutant Discharge and Elimination System stormwater permit that requires the Town to implement and enforce a program to reduce the discharge of pollutants to protect water quality and satisfy requirements of the Clean Water Act.
3. The Town specifically created a Stormwater Utility and Enterprise Fund in 2017 (and increased fees in 2020) to provide dedicated revenue and staff to oversee the Town's stormwater related efforts.

## RACE AND EQUITY AND CLIMATE ACTION

### **Race and Equity:**

Transportation and Infrastructure strategies and projects have been designed to advance race and equity in the town through:

- Modifying Town community engagement practices to reduce barriers for BIPOC and low-income residents' participation.
- Reducing financial barriers or home ownership barriers to access energy efficient, renewable energy, water conservation, and green infrastructure projects.

### **Climate Action:**

The Transportation and Infrastructure strategies and projects aim to advance the Town's Climate Action Plan and Energy and Climate Action Plan through:

- Increasing fossil-free/low fossil-fuel use energy options for all households.
- Incorporating green stormwater infrastructure to streets and roadways to reduce impervious surfaces.

## WATER - DRAFT METRICS

- Track and increase the number of businesses, HOAs, and other organizations that are actively engaged in watershed restoration, stormwater management, and water based public health endeavors.
- Incrementally increase funding for watershed restoration and stormwater management projects every 2-4 years. Rely on a collaborative process between staff and advisory boards, with community input, to determine the amount of the increase.

## WATER - GOALS, STRATEGIES, AND PROJECTS

### **Goal 1: Ensure that Carrboro residents are informed of and engaged with OWASA's water supply, quality, and cost plans.**

OWASA is responsible for the maintenance and quality of water (drinking and wastewater) that Carrboro residents depend on. The main way that the Town of Carrboro can assist OWASA is by enforcing and improving land use protections for the University Lake and the Jordan Lake watersheds, including but not limited to impervious surface limits and water quality and buffer regulations.

**Strategy 1.1:** Coordinate with OWASA and others for the maintenance and improvement of water supply (Jordan Lake Watershed, University Lake).

#### **Projects:**

- a) Identify resident concerns, especially those of marginalized identities, related to water and share with OWASA (Stakeholder interviews).

Create a clear line of communication so that residents can share issues with the Town about water affordability, quality, and supply issues. The Town can share these concerns with OWASA and support work to address these issues. Additionally, encourage OWASA to investigate ways to offer reduced water costs for income-eligible families.

- b) Encourage OWASA to explore affordable water rates targeted to lower-income households (Stakeholder interviews).

OWASA currently sets water rates based on a typical household usage at a base rate, and charges higher rates for greater use. This can still put a high burden on low- and moderate-income residents. OWASA also offers the Care to Share program which is a partnership between OWASA and the Inter-Faith Council for Social Service. All funds donated to Care to Share go directly to providing bill assistance. According to OWASA, while North Carolina law does not allow utilities to offer discounted rates or debt forgiveness for those who cannot pay their water bill, residents have expressed the need for OWASA to explore innovative approaches to address this issue to make sure that water is not turned off due to households not being able to pay their water bills.

- c) Work with OWASA to communicate goals and projects to residents in culturally responsive ways (Stakeholder interviews).

Carrboro should suggest to OWASA how to best communicate to Carrboro residents so that everyone is fully informed. This is particularly important for water efficiency measures which can help reduce financial burden on low-income households and address residents' concerns of drought.

**Goal 2: Protect and restore watersheds and ecosystems.** (Little Creek Watershed Assessment, Morgan Creek Local Watershed Plan, Bolin Creek Watershed Restoration Plan, 2012; Facilitated Small Area Plan 1999).

Due to development, the aquatic health of many of creeks and riparian areas in and around Carrboro have been compromised through pollution, habitat degradation, changes in hydrology, and other stressors. To ensure the health of all species living in and dependent on local creeks, people's access to water, and to improve resilience to climate change, further invest in and protect these ecosystems.



Carrboro is committed to investing in and protecting all bodies of water and ensuring the health of these ecosystems and all the species that rely on them.

**Strategy 2.1:** Continue to implement watershed management and restoration projects. (Bolin Creek Watershed Restoration Plan, 2012, Little Creek Watershed Assessment, 2003; Morgan Creek Local Watershed Plan, 2004).

Stormwater runoff can degrade water quality due to the pollution runoff it picks up as it moves from urbanized and polluted spaces to water bodies. By managing stormwater, the pollution to aquatic ecosystems can be reduced.

## Projects:

- a) Seek additional funding to continue to expand the Stormwater Utility's and Enterprise fund efforts to implement stormwater/bioengineering methods and retrofits. (Morgan Creek Local Watershed Plan, 2004; Jordan Lake Rules, BCWRP).

Identify high priority projects and allocate sufficient budget and staff time to identified projects. Priority projects should be identified via data-driven method and contribute to improvement for the whole watershed, not be isolated to one section and includes equity components to increase stormwater burdened households, low-income households, and BIPOC household's access to clean and healthy water bodies.

Retrofit projects can scale from lot-level stormwater management to larger regional treatment facilities. Successful retrofitting requires available space for structure and maintenance, permission from owner, funding for engineering design and initial construction, regular maintenance, designated entity responsible for maintenance and repairs, and a method to enforce maintenance after construction.

- b) Implement incentive programs for stormwater management or infrastructure mitigation projects for local businesses and develop technical and financial assistance of income-eligible households to participate (Bolin Creek Watershed Restoration Plan, 2012) that prioritize BIPOC-led businesses.

Create job opportunities for BIPOC-led businesses for stormwater management projects to support Carrboro's business enterprise goals. Provide programmatic support to help BIPOC businesses bid competitively to other businesses.

Installing green stormwater infrastructure can be expensive. Identify funding and financing opportunities so that low-income households can also participate and install green stormwater infrastructure.

- c) Research and develop additional and innovative pollution prevention and cleanup, and hillslope, conveyance and channel erosion control practices that build upon current practices to best serve the various ecosystems in Carrboro (Bolin Creek Watershed Restoration Plan 2012).

Work with other agencies and consultants or academics to implement strategies understand pollution prevention, cleanup, and erosion control practices specific to the ecosystems of Carrboro. Prioritize which practices to implement based on budget, impacts on the ecosystem, and carefully consider unintended consequences on historically marginalized residents of Carrboro.

- d) Continue to administer procedures for detecting and removing illicit discharge sources (Carrboro: Illicit Discharge Detection and Elimination Program 2020).

Regularly review and revise the town's Illicit Discharge Detection and Elimination program, maintain a current map of the stormwater system, annually maintain and evaluate written procedures for identifying illicit discharges, train staff appropriately, educate the public, publicize how community members can report illicit discharges, and track violations.

- e) Continue to expand educational efforts on green infrastructure and pollution prevention best practices, as well as hazards of illegal discharge (Little Creek Watershed Assessment, 2003; RainReady, 2020; Carrboro: Illicit Discharge Detection and Elimination Program, 2020).

The recently released and well received Stormwater and Watershed Homeowners Manual is an example of a beneficial resource.

Some residents and business owners of Carrboro may use harmful chemicals to manage their landscapes or improve the aesthetic look of their lawns or gardens. These chemicals pose a danger to water bodies, for example, through eutrophication which robs the water of oxygen, or being acutely or chronically toxic to aquatic organisms. Continue to expand education about more eco-friendly landscape and garden care to reduce these impacts.

Work with resident groups to help spread information about hazards of illegal discharge. Continue to partner with Chapel Hill's stormwater education program or UNC to develop content for the educational campaign.

*"Provide more publicity and outreach to expand existing volunteer waterway cleanups" – Task Force Member*

- f) Assess discharge permits and consider if there is a larger cumulative burden on BIPOC and/or low-income households.

If so, reassess permits to one, decrease permit approvals, and two, ensure that permit approvals do not burden certain populations over others.

- g) Limit disturbance of riparian areas while maintaining sanitary sewer infrastructure and greenways (BCWRP, 2012) (Little Creek Watershed Assessment, 2003).

Work with OWASA and other utilities to identify disturbed riparian areas near infrastructure. Riparian areas refer to terrestrial land in the transition between uplands and aquatic ecosystems. Limit any future disturbance to the maximum extent and reestablish native vegetation when possible.

**Strategy 2.2: Address the effect of development on stormwater management (Bolin Creek Watershed Restoration Plan, 2012, Morgan Creek Local Watershed Plan, 2004, Carrboro: Stormwater Management Plan, 2021).**

Impervious surfaces - due to development - reduce the opportunity for water to infiltrate soil, so instead water runs off and leads to stormwater issues.

## Projects:

- a) Implement structural and non-structural management measures for redevelopment and infill and as retrofits in dense locations to increase stormwater volume control (BCWRP, 2012, Morgan Creek Local Watershed Plan, 2004; Little Creek Watershed Assessment, 2003).

Non-structural management measures cluster and concentrate development, minimize disturbed and impervious areas, reduce runoff, preserve open space, protect natural systems, and incorporate existing landscape features such as wetlands and riparian corridors into site plans. Structural management measures are engineered technologies to store, infiltrate, and evapotranspire runoff and that prevent pollution from entering stormwater runoff.

- b) Incentivize Low Impact Development practices for any new developments that reduce impervious surfaces and mimic natural hydrology (Little Creek Watershed Assessment, 2003; Community Workshop 2020).

Low impact development practices use nature-based solutions (like green stormwater infrastructure) to manage stormwater with infiltration and evapotranspiration.

- c) Stabilize vegetation in new construction above and beyond minim erosion control requirements (Little Creek Watershed Assessment, 2003).

To stabilize vegetation means to maintain existing vegetation at construction sites. This can help prevent erosion during precipitation events because the roots of vegetation keep soils intact. Carrboro can add this as a practice for consideration in approving construction permits.



*One of the ways Carrboro can continue improving water quality is by pursuing stream restoration, enhancing stormwater runoff management projects.*

**Goal 3: Reduce the amount of Carrboro’s treated water use while increasing water rate affordability.**

Reducing treated water use can reduce water costs because less energy and facility use is required when less water is treated, saving expenditure.

**Strategy 3.1:** Promote water conservation and efficiency efforts among residents and businesses (OWASA Long Range Water Supply Plan, 2013).

Support water conservation and efficiency efforts among people of the town, not just of municipal water use.

**Projects:**

- a) Develop programs to educate residents and business owners about local water supply and stewardship programs (OWASA Long Range Water Supply Plan, 2013).

Work with OWASA to support communications on water stewardship programs to residents and business owners. Ensure that education is culturally responsive so that all residents and business owners can understand messaging.



Water conservation programs should be culturally responsive, so all residents and business owners understand the message.

- b) Provide financial and technical assistance to income-eligible residents and business owners to install water conservation and efficiency measures (OWASA Long Range Water Supply Plan, 2013; Triangle Regional Water Supply, 2014).

Partner with OWASA to support water conservation and efficiency programs that reduce cost and technical burden for residents and business owners. Engage community members to support development and implementation of programs to make sure that they are effective and useful for residents.

- c) Establish water efficiency standards for new developments and encourage retrofits to older developments (OWASA Long Range Water Supply Plan, 2013).

Setting water efficiency standards will force developers to build more water efficient buildings. For retrofits, develop a program to help fund retrofits and determine which entity is responsible for retrofits. Work with OWASA to provide technical assistance for these retrofits.

- d) Develop policies to expand safe use of reclaimed water (Triangle Regional Water Supply, 2014).

Reclaimed water is reusing wastewater for other purposes prior to treatment. For example, irrigating gardens with safe wastewater. Identify policies that are barriers to reclaimed wastewater use and advocate for different policies. Support public education around same reclaimed water use.

- e) Initiate water use audits, repairs, and retrofits in government buildings (Collaborative Report on Water Conservation Strategies, 2008).

Improve municipal water efficiency by first auditing water use to determine a baseline and then budget for and implement water infrastructure repairs and retrofits to reduce water use.

- f) Pilot demonstration of water conservation and efficiency projects at public facilities (Collaborative Report on Water Conservation Strategies, 2008).

To encourage private water conservation and efficiency projects, use a public facility as a demonstration project. Educate community members about the projects so that they can become comfortable – speak to how it works and the water and cost savings.

- g) Assess what level water rates must be set at to improve affordability for low-income residents and advocate to OWASA to set affordable rates.

Advocate to OWASA to look at water bill payment data and understand payment trends looking at both qualitative and quantitative data. Facilitate meetings between OWASA and community members to ensure culturally responsive meeting logistics and content. Use meetings to understand how affordability can be improved.



## ENERGY - VISION

Carrboro reduces its dependence on fossil fuel energy sources with opportunities for all residents, especially low-income BIPOC residents, to participate.

## ENERGY - KEY FINDINGS

- 1) Carrboro is working towards their energy goals of reaching 80% reduction of emissions by 2030 when compared to 2010 levels.
- 2) The Town wants to be responsive of social justice while working towards their energy goals by addressing the energy burden on low-income households.

## ENERGY - DRAFT METRICS

- 1) Reduce Greenhouse gas emissions reduction (per capita) by 80% from 2010 levels by 2030.
- 2) Increase Town and community use of renewable energy by xx% by 202x.

## ENERGY - GOALS, STRATEGIES, AND PROJECTS

### **Goal 1: Achieve 80% reduction 2010 levels of per capita greenhouse emissions by 2030.**

This goal was updated in Carrboro's Community Climate Action Plan in October 2020; the previous adopted goal was 50% reduction in greenhouse gas emissions by 2025. The goal refers to community-wide greenhouse gas emissions, not only emissions due to municipal operations.

**Strategy 1.1:** Reduce greenhouse gas emissions from motor automobile use by 80% by 2030 (CCAP 2020).

Transportation is a significant source of greenhouse gas emissions. Automobiles that use gasoline emit greenhouse gasses because the energy source comes from fossil fuels which are rich in carbon. The same is true of electric vehicles unless the electricity to charge them are created from renewable energy. Increased density and infrastructure around mixed-use residential and commercial areas, and accessible alternatives to single-occupancy vehicle travel methods to points of interest, could reduce community emissions due to transportation. Mixed-use areas and transportation options must be widely accessible, affordable, and meet a variety of household needs and preferences.

### **Projects:**

- a) Refer to Transportation project 2.1.a
- b) Provide a variety of public transit options (buses, small buses, vans, etc) and increase opportunities for alternatively fueled vehicles (Community Meeting 2020). Relatedly, improve vanpool and carpool options for commuters and seek funding opportunities from Triangle TDM (CCAP 2014).

The Triangle TDM provides funding opportunities for alternatives to automobile use. Staff should allocate time to understand these opportunities and align these to community desires for a variety of public transit options. A variety of public transit

options may increase service hours while managing concerns of largely empty typically sized buses.

- c) Support adoption of electric vehicles by requiring EV charging stations, infrastructure, and spaces at popular destinations. (CCAP 2020).

As of June 8, 2021, the LUO requires EV charging stations in new developments. Assess where EV charging stations would benefit drivers without displacing current residents from their homes by triggering gentrification. Popular destinations may include downtown Carrboro or recreational locations. Including EV charging stations in new developments can entice environmentally friendly households to reside there. Additionally, research car-sharing electric vehicle programs, so that those who cannot afford their own vehicle can make use of the charging infrastructure as well.

**Strategy 1.2:** 80% reduction 2010 levels of community greenhouse emissions attributed to Carrboro buildings by 2030 (CCAP 2020).

Improve energy efficiency of buildings to reduce emissions related to energy use.

**Projects:**

- a) Continue conducting building energy assessments and ratings for all municipal buildings and inventory energy efficiency measures throughout the town (ECP 2014).

The Town worked with a consultant to establish a baseline of building energy use and develop a rating system to prioritize buildings for energy efficiency projects. The two buildings with work beginning/complete is Town Hall and Century Center.

- b) Increase energy efficiency within municipal buildings with technologies used in weatherization efforts (ECP 2014).

Identify and budget for weatherization best practices – such as those related to insulation, window fixtures, etc. Opportunities should be determined using the information learned from the building energy assessment (in progress).

- c) Address limitations to financing energy efficiency for low-income households and renters by creating and administratively supporting a Rental Environmental Task Force including owners and renters (CCAP 2017).

The Town should partner with a community organization to develop and facilitate a task force comprised of compensated stakeholders, tasked with identifying strategies to increase participation of rental properties in energy efficiency projects. Conduct a community engagement program to develop a program that best serves low-income, renter households. Budget annual amount to implement energy efficiency projects (CCAP 2020).

- d) Support energy efficiency financing for small businesses and low-income households through the Energy Efficiency Revolving Loan Fund (CCAP 2017) and clean energy financing for commercial properties (Environmental Advisory Board).

Conduct evaluation of the Energy Efficiency Revolving Loan Fund program to identify best practices, understand previous program participants' experiences and opinions, and explore changes that would allow greater flexibility and more categories of uses (solar and geothermal). Speak with current business owners that have yet to participate to understand what improvements would benefit potential future participants. Budget annual amount to implement energy efficiency projects (CCAP 2020).

The town of Carrboro is currently part of the [North Carolina Cities Initiative](#) in coalition with several other municipalities. One of 12 action items include reducing barriers for commercial properties to access clean energy by adding a lien and paying off installments through property bills. Co-create how to address barriers for small business owners to ensure that the program is feasible for those with less capital or concerns with liens.

- e) Host renewable energy sites in the business district, among clustered commercial buildings, or Town buildings.

Determine barriers to publicly owned renewable energy sites and advocate for policy changes. Identify opportune locations for renewable energy sites among clustered buildings. Educate the public about the renewable energy site to increase awareness of renewable energy.

- f) Develop a Community Energy Dashboard, using building energy assessment data, to identify progression or regression from the Town's energy goal over time (CCAP 2020).

Using the building energy assessments develop a dashboard that is publicly viewable to show how building energy consumption is supporting or moving away from Town energy goals. Regularly update the dashboard for accurate counts.

- g) Create a utility billing platform to help energy customers (individual households, commercial building owners, and municipalities) understand their energy use.

The Town of Carrboro is currently part of the [North Carolina Cities Initiative](#). One of the agreed upon action items is to create a utility billing platform in partnership with Duke Energy which would be funded through on-bill financing. In the creation, it is imperative that the financing mechanism considers impact on low-income households to ensure that additional billing does not create an energy cost burden.

- h) Create policies that incentivize net-zero construction and energy efficient retrofits in new and existing developments, prioritizing affordable housing developments.

Carrboro is part of the [North Carolina Cities Initiative](#) through which the town can conduct research and understand net zero building stretch codes and advocate for such legislation at the state. Add net-zero provisions or suggestions (if provisions are not legally allowed) to building permits and educate developers and landowners about the provisions. Provide technical assistance on net-zero retrofit construction projects. Prioritize affordable housing development in which residents are energy-burdened (paying a high proportion of their income on energy).

- i) Explore options to increase renewable energy usage through Renewable Energy Credits (RECs) purchases or advocating reinstatement of state solar tax credits. (CCAP 2020).

Advocate with a coalition of other jurisdictions for reinstatement of state solar tax credits. Purchase additional RECs and advocate against any policy barriers to purchasing more RECs.

**Strategy 1.3:** Increase Carrboro's use of renewable energy (CCAP 2017).

Increasing renewable energy use – solar or geothermal are best fits for Carrboro – to reduce greenhouse gas emissions.

**Projects:**

- a) Develop a renewable energy portfolio that takes advantage of federal and state tax credits and supports increased solarization (ECPP 2014).

Work with Duke Energy to increase renewable energies in the portfolio. Research additional solar energy for the portfolio for procurement. Allocate staff time to identify federal and state tax credits to incentivize renewable energy procurement.

- b) Advocate for state legislation that enables Carrboro to invest in renewable energy generation projects that allows shared solar investment benefits in the community or can generate revenue to be invested in community needs, like affordable housing (Community Meeting 2020).

Advocate to the state to streamline community solar facility requirements for utilities and other enabling policies that allow access to solar energy for residents who aren't able to install rooftop solar. Research opportunities and best practices for generating revenue from community solar and allocate these revenues to support affordable housing projects in the town.

- c) Develop programs and policies to support homeowners' ability to generate solar energy on roofs, with consideration for low-income homeowners (Community Meeting 2020).

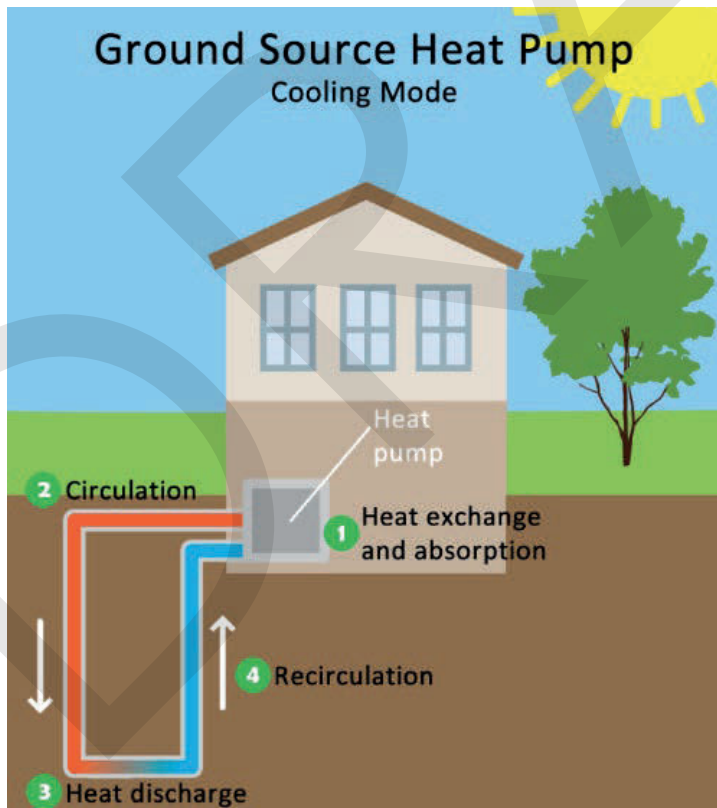
Assess the limitations to homeowners' generating solar energy. Develop financial and technical assistance programs to ease adoption of roof solar energy for low-income homeowners. Finance ideas can include grant base programs, low-cost financing, or on-bill financing – but should be determined with low-income homeowners in program development.



Example of distributed renewable energy (solar panels) Identify opportunities to increase municipal or community-based solar projects (ECPP), including funding to allow participation at a variety of income levels.

d) Investigate opportunities to pursue geothermal installations (CCAP 2020).

The Town can consider a municipal project on owned land along Morgan Creek. Additionally, the town staff should consider how to incentivize installations.



A Geothermal heating and cooling system (EPA).

### **Transportation & Mobility**

- Provide a variety of public transit options (buses, small buses, vans, etc) and increase opportunities for alternatively fueled vehicles
- Support adoption of electric vehicles by requiring EV charging stations, infrastructure, and spaces at popular destinations.
- Coordinate transportation and public infrastructure improvements with stormwater green infrastructure.

### **Climate Action & Environment**

- Increase Carrboro's use of renewable energy
- Support energy efficiency financing for small businesses and low-income households through the Energy Efficiency Revolving Loan Fund and clean energy financing for commercial properties.
- Provide financial and technical assistance to income-eligible residents and business owners to install water conservation and efficiency measures
- Increase public education of the benefits of native plants and vegetation for stormwater management.
- Identify opportunities to promote technical assistance and cost-share grant program to residents seeking to abide by regulatory approaches for encouraging native plant use.
- Invest in the completion of a new significant restoration project.
- Improve canopy downtown to create a more vibrant and inviting urban landscape, reduce the heat island and stormwater runoff, and sequester carbon.
- Continue to implement watershed management and restoration projects.
- Address the effect of development on stormwater management.

### **Affordable Housing**

- Create policies that incentivize net-zero construction and energy efficient retrofits in new and existing developments, prioritizing affordable housing developments.

### **Public Services**

- Continue conducting building energy assessments and ratings for all municipal buildings and inventory energy efficiency measures throughout the town.