

City of Boynton Beach 2020 Climate Action Plan



Local Actions and Policies to Reduce Boynton Beach's Greenhouse Gas Emissions

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List of Abbreviations

BAU = Business as Usual
Compact = Southeast Florida Regional Climate Change Compact
CAP = Climate Action Plan
CDP = Carbon Disclosure Project
CIP = Capital Improvement Program
FCCMA = Florida City and County Management Association
FPL = Florida Power and Light
FPU = Florida Public Utilities
FSDN = Florida Sustainability Directors Network
GCoM = Global Covenant of Mayors for Climate & Energy
GHG = Greenhouse Gas
GHGI = Greenhouse Gas Emissions Inventory
GPC = Global Protocol for Community-Scale Greenhouse Gas Inventories
ICLEI = International Council for Local Environmental Initiatives
IPCC = Intergovernmental Panel on Climate Change
LGOP = Local Governmental Operations Protocol
MTCO₂e = Metric Tons of Carbon Dioxide Equivalent Emissions
PACE = Property Assessed Clean Energy
RCAP = Regional Climate Action Plan
SAT = Sustainability Advisory Team
SSC = Staff Sustainability Committee
SSDN = Southeast Sustainability Directors Network
SWA = Solid Waste Authority of Palm Beach County
USDN = Urban Sustainability Directors Network

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Executive Summary

The City of Boynton Beach started planning for climate change a decade ago with the release of its first Climate Action Plan (CAP) in 2010 and adoption of the Southeast Florida Regional Climate Change Compact in 2012. In 2018, the City joined the Global Covenant of Mayors for Climate & Energy—an alliance of more than 9,200 cities around the world committed to climate leadership. This updated 2020 CAP offers a robust set of strategies and actions to reduce Boynton Beach's greenhouse gas (GHG) emissions. This plan reflects the latest science, aligns with international standards for GHG reduction, integrates the City's other strategic planning goals and initiatives, and emphasizes the importance of ongoing, equitable community engagement.

This CAP focuses on climate mitigation, i.e., reducing GHG emissions. Climate adaptation, i.e., preparing the community for impacts of climate change, will be addressed in a separate plan.

Vision Statements

This CAP sets forth the following long-term visions for our community:

- Make Boynton Beach a regional and national leader in sustainability through innovative policies, programs, and partnerships.
- Become a leader in energy efficiency and clean energy that comes from the sun, wind, or other renewable technologies.
- Create a greener Boynton Beach by enhancing the tree canopy and native plant and wildlife communities.
- Transform Boynton Beach into a community where people walk, bike, take transit, or carpool for most trips in a safe, accessible, and affordable transportation network.
- Inspire citizen engagement and ensure that the benefits of climate action are shared equitably among all community members.

Co-Benefits

While geared primarily toward GHG reduction, the strategies in this plan are expected to produce a number of additional benefits for the people, economy, and environment of Boynton Beach:

- **Cost Savings** by reducing costs of electricity and vehicle fuel/maintenance
- **Economic Development** by promoting local green businesses and ecotourism
- **Public Health** by reducing air pollutants and promoting active lifestyles
- **Ecosystem Protection** by enhancing greenspace and reducing plastic pollution
- **Climate Resilience** by reducing urban heat and promoting resilient energy systems

GHG Emission Reduction Targets and Strategies

Following recommendations of the Intergovernmental Panel on Climate Change (IPCC) and ICLEI-Local Governments for Sustainability, the 2020 CAP establishes the following GHG emission reduction targets for both City Government and the Boynton Beach Community:

- 50% reduction below 2015 levels by 2035
- Net zero GHG emissions by 2050

The City has collected data on government emissions for calendar years 2006, 2015, 2017, and 2018; and for community-wide emissions for calendar years 2015 and 2017. Government emissions are in decline as a result of both 1) a reduction in the City's electricity consumption and 2) an increase in the percentage of electricity in the electrical grid that is generated from renewable sources. Community-wide emissions also decreased slightly from 2015 to 2017 despite a population increase. These downward trends suggest that the 50% reduction target by 2035 is feasible.

The CAP presents 18 GHG emission reduction strategies: 6 for Government Operations and 12 for the Boynton Beach Community. The strategies are organized according to the structure of the GHG inventory data, enabling the City to track progress in direct relation to GHG metrics.

Strategies for Government Operations:

1. Transportation
 - Green Fleet
 - Employee Commute Reduction
2. Buildings & Facilities
 - Building Efficiency
 - Water Infrastructure Efficiency
 - Renewable Energy in Government Facilities
3. Waste
 - Green Office Practices

Strategies for Boynton Beach Community:

1. Transportation & Land Use
 - Compact & Mixed Use Development
 - Bike & Pedestrian Infrastructure
 - Electric Vehicle Infrastructure
 - Transit Enhancement
 - Urban Forestry
 - Greenspace Preservation
2. Buildings
 - Green Building Standards
 - Energy Efficiency & Conservation
 - Water Efficiency & Conservation
 - Renewable Energy Planning & Promotion
3. Waste & Consumption
 - Waste Reduction & Recycling
 - Sustainable Lifestyle & Consumption

Each strategy is summarized in Table 1 (pages 18–20) with an objective statement, list of responsible departments, associated co-benefits, level of community priority, and level of GHG reduction potential. The Strategy Implementation Guide (Appendix) provides details about each strategy—including an inventory of City progress to date and a list of specific actions for future implementation.

The CAP is a Living Document

Progress on implementing CAP actions and meeting the GHG reduction targets will be tracked and communicated to City leaders and the community on an annual basis. The Strategy Implementation Guide (Appendix) is a living document that will be continually updated as the City completes the listed actions and refines them based on new information, technologies, policies, and priorities. We are working to develop it into an interactive plan that can be tracked in on an online platform. The City will also continue to report emissions annually to fulfill our commitment to the Global Covenant of Mayors for Climate and Energy.

Funding for CAP actions comes from multiple sources including the Utilities Administration budget, the City Capital Improvement Program (CIP), the Utilities CIP, grant funding, and the Green Building/Sustainable Community Fund (via revenue from the City's green building fee). A number of regional and international sustainability networks offer ongoing technical assistance and guidance on best practices for financing climate action.

Introduction

Our Climate Challenge

Climate, by definition, suggests a degree of stability and predictability in an area's prevailing long-term weather patterns. However, as we enter the 2020s, we can no longer assume that current and future weather patterns will resemble those of the past. The global climate is changing faster than at any time in modern history, presenting growing challenges to human health, quality of life, the economy, and natural systems. Average global temperature has increased by about 1.8°F (1°C) in the last century. Observed evidence demonstrates that this warming trend can only be explained by the effect of human activities, particularly the emission of greenhouse gases (GHGs) from the burning of fossil fuels.ⁱ

The following are some of the most salient effects of a changing climate for Boynton Beach:

- **Extreme heat:** According to the National Oceanic and Atmospheric Administration, July 2019 was the hottest month ever recorded.ⁱⁱ The years 2014–2018 are the hottest years on record, and 18 of the 19 hottest years have occurred since 2001.ⁱⁱⁱ The Union of Concerned Scientists project that in Palm Beach County, the annual number of days with a heat index above 105 degrees could jump from two (historically) to 120 in the late 21st century.^{iv}
- **Hurricanes:** A warmer ocean produces more intense hurricanes and makes them intensify much more rapidly; and a warmer, wetter atmosphere causes them to produce more rainfall. Storm surges are becoming stronger and are resulting in more flooding as sea levels rise.^v Recent science also indicates that shifts in the jet stream and the Bermuda High can hold storms in place longer, leading to more severe local impacts.^{vi}
- **Sea level rise:** Globally, average sea level has risen approximately 8–9 inches since 1880, and about 3 inches of rise has occurred since 1990.^{vii} Nuisance flooding is becoming more frequent in low-lying areas of Boynton Beach and around South Florida, particularly in connection with seasonal “King Tide” events. The Unified Sea Level Rise Projection for Southeast Florida (updated in December 2019) recommends planning for a rise of 10-17 inches by 2040, 21-40 inches by 2070, and 40-92 inches by 2120, or more based on the adaptability and costs of the infrastructure.^{viii}

Although some impacts are already locked in as a result of accumulated GHG emissions, the severity of future impacts may still be limited if actions are taken today. The latest analysis by the Intergovernmental Panel on Climate Change (IPCC) determined that global emissions must be cut by about 45% by the year 2030—and 100% by 2050—to avoid extreme consequences associated with a rise of 2.7°F (1.5°C) above preindustrial temperatures.^{ix} To date, 185 nations and the European Union have ratified the Paris Agreement of 2015, which aims to keep global temperature rise to no more than 1.5° to 2°C above pre-industrial levels. The Agreement requires all parties to establish nationally determined contributions, to report emissions and implementation progress regularly, and to strengthen their efforts in the future.^x At the United Nations Climate Action Summit in September 2019, 65 countries and major sub-national economies committed to net zero GHG emissions by 2050.^{xi}

According to the Global Covenant of Mayors for Climate & Energy, cities are home to more than half the world's population, consume more than two thirds of the world's energy, and account for more than 70% of global GHG emissions. Because land use, buildings, and transportation are largely controlled at the local level, cities have a significant role to play in reducing global emissions. Although some solutions to the climate crisis are beyond the authorities of local governments (e.g., regulating energy utilities, setting automobile efficiency standards), cities can wield their influence by passing local ordinances and zoning codes, leading by example, implementing community programs, partnering with utilities, and advocating for state action^{xii}. Increasingly mindful of this power, cities around the world are launching ambitious climate initiatives to help meet national goals set by the Paris Agreement. ICLEI—Local Governments for Sustainability (ICLEI) reports that more than 400 cities and regions around the world have committed to ambitious climate action including carbon neutrality, divesting from fossil fuels, declaring climate emergency, and 100% renewable energy. The City of Boynton Beach is advancing its own commitment to climate leadership through the adoption and implementation of this 2020 Climate Action Plan.

Local and Regional Climate Leadership

The City of Boynton Beach began planning for climate change in 2008 through the leadership of a Green Task Force comprised of the Vice Mayor, Assistant City Manager, and seven City staff. The City hired CDM-Smith to conduct its first GHG inventory and develop its first Climate Action Plan (CAP) with input from staff and a Green Community Alliance consisting of 20 local subject-matter experts. The City received a 2010 Energy Efficiency Conservation Block Grant from the U.S. Department of Energy to complete the CAP as well as demonstration projects including five electric vehicle charging stations in City lots, solar panels and water heaters at Fire Station No. 5, and an energy-efficient lighting retrofit of the Ezell Hester Jr. Community Center. Adoption of the CAP (Resolution No. R10-150) was soon followed by the establishment of a voluntary Green Building Program (Ordinance No. 11-014). The City's Green Building Program received the 2011 Gala Verde Award for Green Outstanding Government by the U.S. Green Building Council's South Florida Chapter, and the CAP was awarded the 2012 Award for Program Excellence from the Florida City and County Management Association (FCCMA).

The City's initial climate action progress coincided with regional action, as Broward, Miami-Dade, Monroe, and Palm Beach Counties united to form the Southeast Florida Regional Climate Change Compact in 2010. The City of Boynton Beach was one of the first municipalities to join the Compact (December 4, 2012) and served as the municipal representative for Palm Beach County during the Compact's initial years. The Compact provides a forum for information exchange, policy advocacy, and leveraging of funding opportunities; and facilitates municipal climate action planning through products such as the 2015 Unified Sea Level Rise Projection, 2012 Regional Climate Action Plan (RCAP), and 2017 RCAP 2.0. Boynton Beach remains an active member and is using the RCAP 2.0 as guiding document for many of the strategies and actions detailed in this CAP.

The City released a revised CAP in 2015 (adopted via Resolution No. R15-166), which integrated recommendations of the 2012 RCAP and tracked the status of progress since 2010. The 2015 CAP highlighted recent accomplishments, such as updating the Comprehensive Plan Coastal Element to consider sea level rise and other flood risks as mandated by the 2015 Peril of Flood statute (S.B. 1094); adopting a Greenways, Blueways, and Trails Master Plan (Resolution No. R15-143); and establishing a Property Assessed Clean Energy (PACE) financing program (Ordinance No. 16-017). To administer the 2015 CAP, the plan recommended creating a position for a dedicated full-time Sustainability Coordinator, which the City did in July 2017. The Sustainability Coordinator works under the direction of the Utilities Deputy Director and leads a Staff Sustainability Committee (SSC) consisting of 27 staff members from across nearly all City departments. The SSC meets quarterly to oversee the planning and

implementation of the CAP, with smaller interdepartmental groups organized as needed to advance specific projects.

The City’s Office of Sustainability receives continual support from regional networks including the Florida Sustainability Directors Network (FSDN) and the Southeast Sustainability Directors Network (SSDN). Both groups organize annual in-person meetings and monthly phone calls to facilitate information sharing and build capacity for community sustainability across the state and region. They also draw on the resources of broader organizations such as the Urban Sustainability Directors Network (USDN) and ICLEI for education and technical assistance.

Global Covenant of Mayors for Climate & Energy

In 2018, the City of Boynton Beach elevated its commitment to climate leadership by joining the Global Covenant of Mayors for Climate & Energy (Resolution No. R18-030). The Global Covenant (GCoM) is an alliance of more than 9,200 cities and local governments, in 132 countries around the world, with a shared long-term vision of supporting voluntary action to combat climate change. The GCoM aims to advance city-level transition to a low emission and climate-resilient society by serving as a nexus across cities, city networks, research institutions, philanthropies, and the private sector.

GCoM cities must report their climate data and actions annually on an official reporting platform. In 2019, GCoM partners ICLEI and the Carbon Disclosure Project (CDP) released a unified reporting system to streamline and standardize reporting across cities. CDP and ICLEI review cities’ submissions, coordinate amendments, and award GCoM badges for Climate Mitigation and Climate Adaptation across three phases: Mitigation Inventory, Target, and Plan; and Adaptation Assessment, Goal, and Plan. In 2019 they added a third pathway for Access to Energy but have not yet begun tracking progress in this area.

In 2019, the City of Boynton Beach was awarded the Mitigation badge for the Inventory phase (Figure 1). Upon adoption of this CAP, we expect to receive the Mitigation Target and Plan badges. As we also begin a separate Climate Adaptation planning process in the next year, we expect to advance along the Adaptation track as well.



Figure 1. Boynton Beach’s current status in the Global Covenant of Mayors for Climate and Energy.

Both CDP and ICLEI provide ongoing technical assistance to facilitate the City's climate action planning progress. In addition, CDP provides feedback in the form of a scorecard rating cities' progress on climate action ranging from D (Disclosure) to C (Awareness) to B (Management) to A (Leadership). In 2019, the City of Boynton Beach received an overall score of C (Awareness), indicating that "Your city has begun developing assessment and measuring impacts to get a holistic understanding of the main impact climate change has on your city. This will allow you to understand the climate risks that face your city and thereby begin to create adaptation and mitigation plans." CDP gave us a score of C for both Mitigation and Adaptation, documented our progress vis-à-vis other cities in North America and globally, and provided recommendations to improve our City's score.

Plan Purpose and Vision

This CAP is a framework for the development and implementation of actions to reduce Boynton Beach's GHG emissions. By reducing emissions and promoting multiple co-benefits (as described below), this plan serves as the main guiding document for sustainability in the City of Boynton Beach. Sustainability means meeting the needs of today's residents without compromising the ability of future citizenry to meet their needs. The three pillars of sustainability are environmental stewardship, economic growth, and social responsibility.

Vision Statements

This CAP sets forth the following long-term visions for our community:

- Make Boynton Beach a regional and national leader in sustainability through innovative policies, programs, and partnerships.
- Become a leader in energy efficiency and clean energy that comes from the sun, wind, or other renewable technologies.
- Create a greener Boynton Beach by enhancing the tree canopy and native plant and animal communities.
- Transform Boynton Beach into a community where people walk, bike, take transit, or carpool for most trips in a safe, accessible, and affordable transportation network.
- Inspire citizen engagement and ensure that the benefits of climate action are shared equitably among all community members.

This CAP focuses on climate mitigation, i.e., reducing GHG emissions. Climate adaptation, i.e., preparing the community for impacts of climate change, will be addressed in a separate plan. Boynton Beach is currently initiating a climate adaptation planning process. In November 2019, the City signed an interlocal agreement to conduct a multi-jurisdictional climate change vulnerability assessment in collaboration with seven neighboring municipalities and Palm Beach County (Resolution No. R19-130). The vulnerability assessment is expected to be completed by March 2021 and will result in a prioritized list of adaptation strategies at the regional and community scales.

This CAP was developed to align with existing City plans including the Comprehensive Plan; the 2015 Greenways, Blueways, and Trails Plan; and the 2016 Community Redevelopment Plan. Most recently, the City's Strategic Plan (approved by City Commission in June 2019) states the mission of the City of Boynton Beach as being "a vibrant and sustainable community that provides exceptional services." The plan establishes three strategic pillars—Vibrant and Resilient Living, Connected and Engaged Community, and Robust Local Economy—and six top six priorities for the City: Culturally Distinct Downtown, Building Wealth in the Community, Transportation and Mobility, High Performing Organization, Public Health and Safety, Environmental Sustainability. Implementation of this CAP is the

key strategic project within the area of Environmental Sustainability. In addition, many of the co-benefits of this plan overlap with the City's other strategic priorities.

Co-Benefits

Actions to reduce GHG emissions produce a number of additional benefits for the environment, people, and economy of Boynton Beach. We have identified five major "co-benefits" that are expected to arise from the suite of GHG reduction strategies included in this plan. This list was developed based on a review of the academic literature^{xiii} and other cities' Climate Action Plans (e.g., Memphis-Shelby County, City of Iowa City, and City of Solana Beach).



Cost Savings: Many of the measures in this plan pay for themselves by reducing costs to the City and its residents. Encouraging energy efficiency, water efficiency, and adoption of renewable energy will lower utility bills for residents and businesses. Promoting use of alternative transportation such as bicycling, walking, public transit, ridesharing, and electric vehicles will lead to cost savings compared to fueling and maintaining a gasoline or diesel vehicle. City government can also enjoy substantial savings through increased efficiencies in buildings, facilities operations, and vehicle fleets.



Economic Development: This CAP includes actions to support and incentivize locally held businesses, which will foster local economic development while reducing GHG emissions from transportation of products and services. The plan will enhance community vibrancy by promoting compact, mixed-use development and pedestrian- and bike-friendly neighborhoods. Initiatives to expand the City's tree canopy and greenspace will increase residential property values, viability of local businesses, and the City's appeal to outdoor recreationists. Many initiatives in the plan will support the growing "green economy" and job growth in sectors such as renewable energy, sustainable tourism, green construction, and urban forestry.



Public Health: Actions that reduce GHG emissions also reduce other air pollutants such as particulate matter, SO₂, NO_x, and ozone that are linked to asthma and other respiratory diseases. Climate mitigation activities help clean the air by reducing emissions from vehicles and power plants, therefore improving public health and reducing disease prevalence. This plan also increases opportunities for active lifestyles by promoting compact development and working to increase pedestrian/bicycle infrastructure. In addition, expanding urban tree canopy and greenspace can reduce stress, promote physical activity, and reduce rates of asthma, cardiac disease, and strokes from improved air quality. More trees will also help cool our city streets, reducing heat-related illnesses as our climate warms.



Ecosystem Protection: Globally, GHG mitigation helps to prevent negative impacts on ecosystems, including biodiversity loss, ocean acidification, soil degradation, water pollution, and the loss of ecosystem services. Here in Boynton Beach, we can help to safeguard native ecosystems by protecting greenspace and planting native trees and vegetation to support populations of migrating birds, pollinators, and other wildlife. Water conservation and efficiency reduces GHG emissions from energy use while also protecting ecosystems by

avoiding negative consequences of drought. Waste reduction activities, particularly those focused on single-use plastic products, can help reduce the effects of harmful plastic pollution in our marine, freshwater, and terrestrial ecosystems.



Climate Resilience: As noted, the City is developing a separate Climate Adaptation Plan that will focus on measures to increase community resilience to the impacts of climate change. However, there is some overlap between the two plans as some climate mitigation actions also help enhance climate resilience. For example, planting trees increases carbon sequestration while also protecting against flooding by absorbing stormwater. Rooftop solar energy installations, when paired with battery backup, can increase resilience by providing backup power in the aftermath of a hurricane. Water conservation, particularly during the dry season, can help protect against saltwater intrusion in coastal wellfields as sea levels rise.

Community Engagement

The City of Boynton Beach recognizes that active and ongoing collaboration with the community is necessary to advance climate action and sustainability. Building on the Community Alliance concept from the City's 2010 CAP, and with support of the City Commission, City Manager, and SSC, the Sustainability Coordinator convened a Sustainability Advisory Team (SAT) in September 2018. The SAT is a core group of highly committed volunteers that serves as an ongoing link between the Office of Sustainability and the Boynton Beach community. The SAT meets monthly to provide oversight of the City's sustainability program, review products and publications, coordinate educational events and volunteer opportunities, and generate ideas for new initiatives. The SAT comprises 10 community members with a range of knowledge and interests, representing various City neighborhoods and local organizations including the Sierra Club, Citizens Climate Lobby, The Climate Reality Project, and The Reef Institute. SAT applications are accepted on an ongoing basis and new members are added when there are vacancies.

The SAT identified the following priority topics for 2019-2020: Reducing & Recycling Single-Use Plastics, Protecting & Enhancing Greenspace, Promoting Residential/Community Green Options, Energy Conservation & GHG Reduction, Hurricane/Storm Surge Resilience, and Climate Change Awareness. Within these topic areas, team members are encouraged to spearhead individual projects with support from the SAT and Sustainability Coordinator. Current and recent SAT projects include the purchase of the City's "Aquafil" mobile water bottle refill station, the ongoing Galaxy Sand Pine Scrub Preserve restoration project, a recycling pilot project at Oceanfront Park, and research into solar energy development at the City's closed municipal landfill. The SAT volunteers also help to staff the City's sustainability table at community events, and served as facilitators at the Climate Action Workshop discussed below.

To directly engage the community in the development of this plan, the City held a Climate Action Workshop on October 29, 2019, from 6:30 to 8:00 pm at the Boynton Beach Senior Center. The City promoted the workshop via the City website, newsletter, and social media; press release; targeted outreach to schools, faith groups, and environmental organizations; and in person through the distribution of fans and flyers at prior City events. Attendees represented a range of ages and a degree of racial and ethnic diversity. The overarching message of the workshop was that government and citizens need to work together to tackle the climate crisis. After an introductory presentation by the Sustainability Coordinator, participants rotated among five discussion tables on the following topics:

Transportation, Energy & Water, Waste & Consumption, Trees & Greenspace, and Climate Adaptation. A volunteer SAT member facilitated each table. For each topic, participants were asked to brainstorm answers to two questions: "What can City government do?" and "What can citizens do?" At the end of the table rotations, participants were asked to identify 1) the top three actions they would like to see the City implement and 2) the top three actions they will commit to personally. The government actions with most "votes" included controlling or limiting development in risk areas, requiring more green space with a variety of native plants in new developments, planting more canopy trees, banning plastic bags, and installing microgrids. The citizen actions with the greatest commitments included refusing single-use plastics, pledging to buy an electric car, walking and biking more, eating at home more, and voting for climate aware candidates.

The workshop results and SAT priorities were used to categorize GHG reduction strategies in this plan as low, medium, or high community priority (described in the GHG Emissions Strategies section below). Specific ideas from the Climate Action Workshop and the SAT were also integrated into the Strategy Implementation Guide (Appendix).

Social Equity

Historically, communities of color and low-income populations have been underserved by climate-related programs and investments, and underrepresented in decision making. These communities already experience institutional and systematic oppression resulting in less access to resources, capital, and services. For example, low-income communities and communities of color may lack access to healthy food, energy-efficient housing, and low-carbon, safe transportation options—disparities that result in fewer benefits from climate mitigation actions. Compounding this, climate change is likely to amplify the impacts of existing inequities. Frontline communities such as the elderly or chronically ill, people of color, the poor and homeless, people with disabilities, refugees, and immigrants are likely to bear the brunt of climate impacts without the necessary infrastructure and support systems.

Boynton Beach is the third largest city in Palm Beach County (estimated 2019 population 77,696) with a racially diverse population including 64% White, 31% Black/African American, and 5% other races. Approximately 16% of the population is of Hispanic ethnicity. Compared to the state of Florida, Boynton Beach has a larger share of seniors over age 65 (21% vs. 19%), people in poverty (17% vs. 15%), people with disabilities (15% vs. 13%), and people without health insurance (18% vs. 15%). The City has higher housing-cost burdens than elsewhere in the state, with 39% of households paying more than 30% of their income on mortgage and 62% paying more than 30% of their income on rent. (These rates are 35% and 53%, respectively, in the state of Florida.)^{xiv}

The City is mindful of its diverse populations and prides itself on its inclusivity and accessibility. Building on this legacy of inclusiveness, the CAP is being developed and implemented with an eye towards social equity. Following the Southeast Florida RCAP, we embrace the goal of creating "equitable climate policies, programs, and decision-making processes that consider local socioeconomic and racial inequities and ensure all can participate and prosper."^{xv} Many of our partner organizations, including the Compact, FSDN, SSDN, GCoM, CDP, and ICLEI, offer resources and guidance to assist us in embedding equity into the climate action planning process.

The primary ways to ensure an equitable CAP are to elicit diverse stakeholder participation and to consider the impacts that the recommended strategies may have on vulnerable populations. As described above, we seek diversity in community engagement by using targeted outreach to schools, faith groups, and partner organizations—and by reaching people in person at community events. Moving forward, we will work to ensure that the SAT comprises a diverse group of stakeholders from grassroots

groups, business representatives, faith and spiritual communities, and multiple City neighborhoods. We will expand engagement with members of vulnerable communities and community leaders, and foster partnerships with intermediary organizations that have deep community ties. We will hold environmentally focused workshops and events in diverse City neighborhoods, and expand the presence of the Office of Sustainability into an array of existing City events and programs. We will seek opportunities to provide equity and social training for government staff and partners.

From transportation, to energy efficiency, to tree canopy, many of the strategies and actions in this CAP have important equity considerations. As we implement the plan, we aim to apply an equity lens to all actions, programs, and policies. The following equity considerations, developed by the City of Portland and Multnomah County, Oregon, will serve as a guide during CAP implementation:^{xvi}

- Disproportionate: Does the action generate burdens to disadvantaged communities?
- Shared: Can the benefits of the action reduce historical or current disparities?
- Accessibility: Are the benefits of the action broadly accessible?
- Engagement: Does the action engage & empower communities in a meaningful & culturally appropriate manner?
- Capacity: Does the proposed action help build community capacity?
- Alignment & partnership: Does the action align with & support community priorities?
- Relationship: Does the action help foster effective, long-term relationships?
- Economic opportunity & staff diversity: Does the action support workforce development?
- Accountability: Does the action have accountability to ensure equitable benefit?

Boynton Beach's GHG Emissions

Types of Greenhouse Gas Emissions

Greenhouse gases (GHGs) make the planet warmer by trapping heat. There are different types of GHGs such as carbon dioxide, nitrous oxide, sulfur dioxide, and methane. In the United States, the most significant sources of human-induced GHG emissions come from the combustion of fossil fuels for transportation and the generation of electricity used in buildings and industry.^{xvii} GHG reporting is becoming increasingly important. Nations, states, local governments and businesses are facing increased demand from stakeholders to demonstrate progress toward meeting carbon reduction commitments established by organizations like the GCoM and international agreements like the Paris Agreement.

A city's GHGs are classified into three scopes for reporting purposes:

- Scope 1: Direct GHG emissions that occur within the city
- Scope 2: Indirect GHG emissions from the use of grid-supplied electricity, heat, or cooling
- Scope 3: Other GHG emissions that occur outside the city as a result of activities taking place within the city

In Boynton Beach, Scope 1 emissions consist primarily of the combustion of gasoline and diesel fuel from transportation, because these emissions are discharged directly from the tailpipe. Scope 2 emissions consist primarily of electricity purchased from Florida Power and Light (FPL), because fuel used to generate the electricity is combusted and emitted at a power plant located outside the City. Scope 3 emissions consist primarily of solid waste that is transported outside of the City to the waste-to-energy plants, recycling facility, and landfills operated by the Solid Waste Authority of Palm Beach County.

Protocols require cities to report Scope 1 and 2 emissions, while reporting Scope 3 emissions is encouraged but considered optional. This is because Scope 3 data can be difficult to capture and cities may have limited influence on reducing Scope 3 emissions. An example of Scope 3 emissions not captured in our GHGIs include those resulting from the production of food and merchandise that is consumed in Boynton Beach.

Greenhouse Gas Emissions Inventories

A GHG emissions inventory (GHGI) involves collecting data for each scope of emissions for a particular jurisdiction and calculating the resulting quantity of GHGs emitted in metric tons. The GHGI is an important tool that forms the foundation of the City's CAP, enabling the City to set reduction targets and monitor progress. The GHGI also provides fine-scale data on electricity and fuel use in government operations, empowering staff to improve energy efficiency and reduce costs.

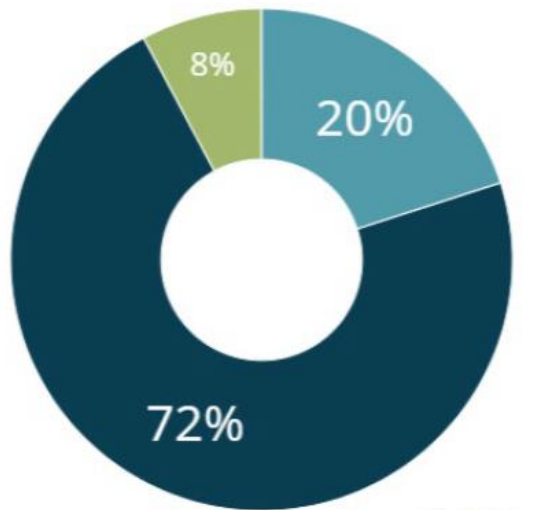
The City of Boynton Beach has been proactively conducting GHGs for both government operations (Government GHGI) and the entire Boynton Beach City limits (Community GHGI) since the City's original CAP was developed in 2010. The Government GHGI focuses on emissions from activities, assets, and facilities controlled by the City of Boynton Beach. The Government GHGI is based on the Local Governmental Operations Protocol (LGOP^{xviii}). Complete Government GHGIs were completed for calendar years 2006, 2015, 2017, and 2018. The Community GHGI focuses on emissions from activities, assets, and facilities controlled by the residential, commercial, and business sectors of the community. The Community GHGI is based on the Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC^{xix}). Complete Community GHGIs were completed for calendar years 2015 and 2017. For details on the GHGI methodologies, please contact the Office of Sustainability.

Government GHGI Results

Totaling data across all years inventoried, 72% of emissions from government operations were indirect Scope 2 generated from purchased electricity (Figure 2A). Twenty percent (20%) of emissions are direct Scope 1 generated mainly from the use of transportation fuel. Eight percent (8%) are Scope 3 generated from employee commuting and solid waste sent to the waste-to-energy plants, recycling facility, and landfills controlled by Palm Beach County.

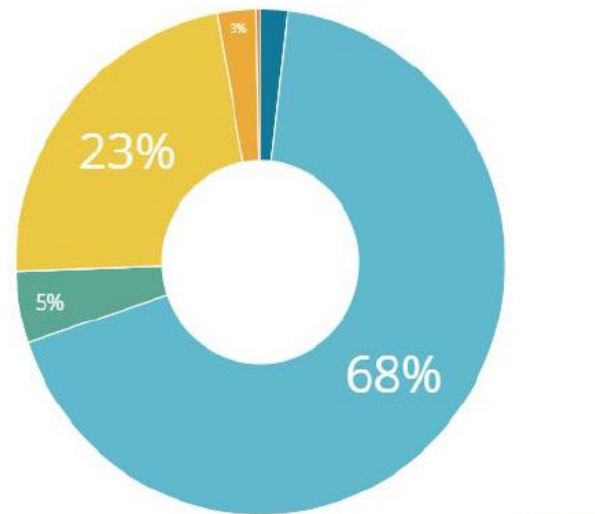
Another way to break down Government GHGI data is by sector as defined in the LGOP (Figure 2). Buildings and facilities generated 68% of emissions, followed by on-road transportation which generated 23% of emissions. Lighting from parks, garages and ballfields generated 5% of emissions followed by 3% from the South-Central Regional Wastewater Treatment Plant (SCRWWTP). Remaining sectors (solid waste, irrigation and pumps) accounted for only 2% and 0.3% respectively.

Government GHG Emissions by LGOP Scope
All Years Inventoried (2006, 2015, 2017, 2018)



A.

Government GHG Emissions by LGOP Sectors
All Years Inventoried (2006, 2015, 2017, 2018)



B.

Figure 2. Boynton Beach Government Greenhouse Gas Emissions Inventory results across all years inventoried by A) Scope and B) Sector.

Emissions from government operations have gradually declined since calendar year 2006 from 28,000 Metric Tons of Carbon Dioxide Equivalent Emissions (MTCO₂e) to 23,690 MTCO₂e in 2018. This represents a 14% reduction from 2006 to 2018 or 4,040 MTCO₂e (Figure 3). Scope 1 and 3 emissions declined modestly from 2006 to 2015 and then remained relatively constant from 2015 to 2018. The most significant reductions occurred in Scope 2 purchased electricity. This can be attributed to both 1) a decline in electricity consumption by the City and 2) an increase in the percentage of electricity in FPL's electrical grid that is generated from renewable sources such as solar. For example, City electricity consumption declined from 38,080,000 kilowatt hours in 2017 to 36,390,000 kilowatt hours in 2018. The electricity grid emissions factor also improved, declining from 0.555789 in 2017 to 0.4611047 in 2018.

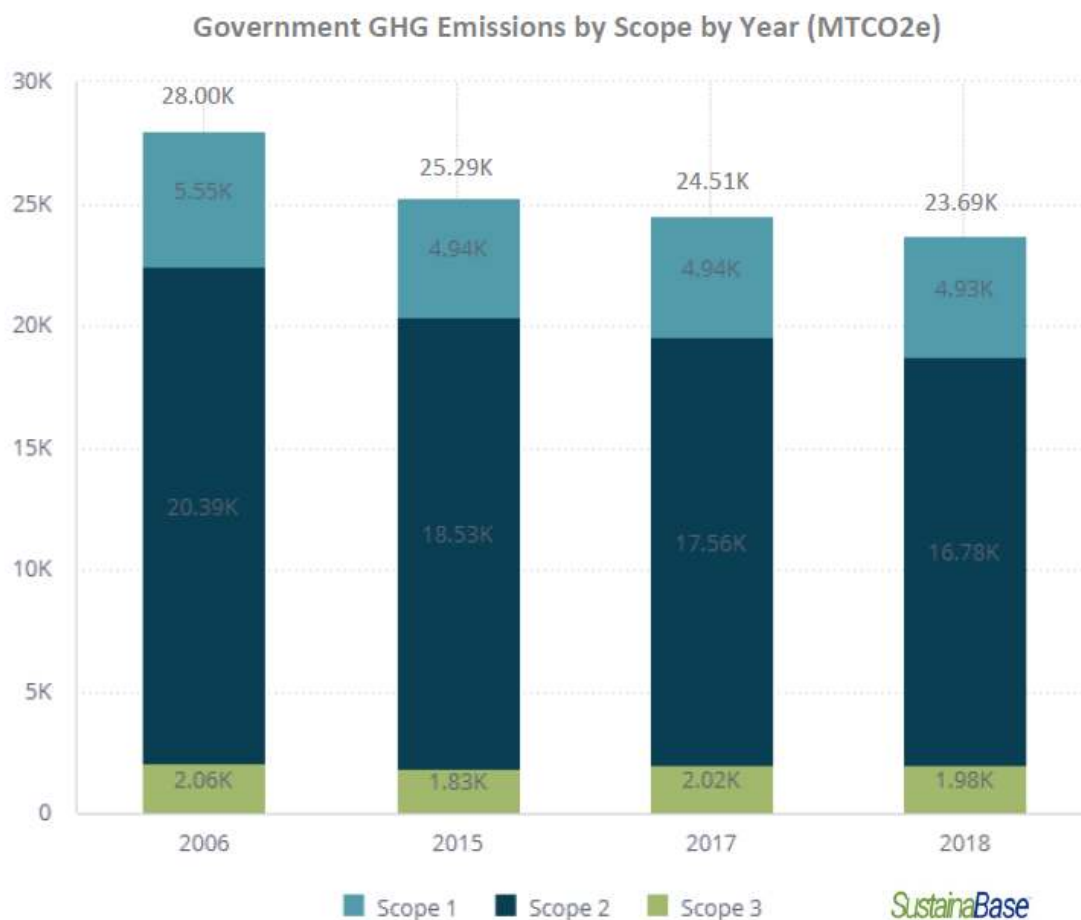
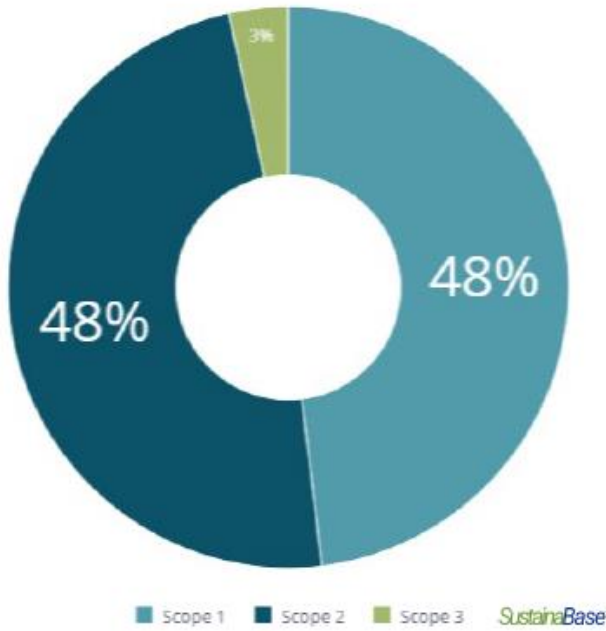


Figure 3. Boynton Beach Government Greenhouse Gas Emissions Inventory results by scope and year.

Community GHGI Results

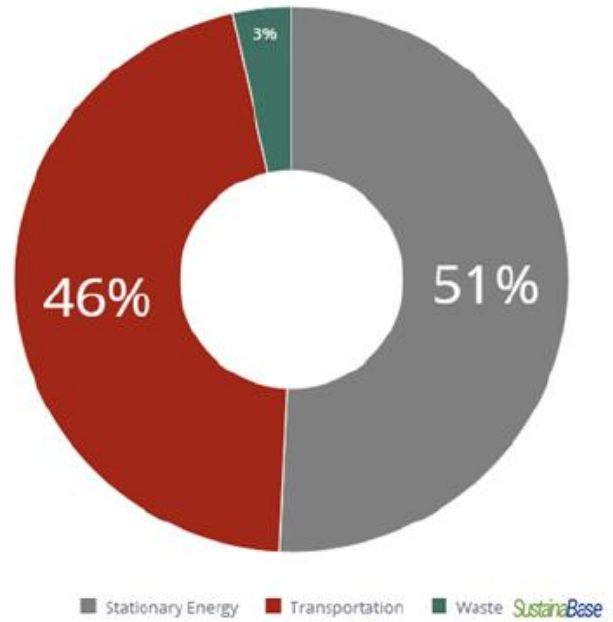
Totalling the two years of Community GHGI data, 48% of emissions were Scope 2 generated from purchased electricity, 48% Scope 1 generated mainly from the use of transportation fuel, and 3% Scope 3 generated from solid waste processed outside of City limits by the Solid Waste Authority of Palm Beach County (Figure 4A). The breakdown by emissions sector (as defined in the GPC) looks similar, with stationary energy generating 51% of community-wide emissions, transportation generating 46%, and Solid Waste generating 3% (Figure 4B).

Community GHG Emissions by GPC Scope
All Years Inventoried (2015, 2017)



A.

Community GHG Emissions by GPC Sectors
All Years Inventoried (2015, 2017)



B.

Figure 4. Boynton Beach Community Greenhouse Gas Emissions Inventory results across all years inventoried by A) Scope and B) Sector.

Community emissions have slightly decreased since calendar year 2015 from 904,666 Metric Tons of Carbon Dioxide Equivalent Emissions (MTCO₂e) to 902,875 MTCO₂e in 2017 (Figure 5).^{xx} This represents an overall 0.2% reduction from 2015 to 2017. During this period, Scope 1 and 3 emissions increased while Scope 2 emissions decreased. Thus, the decline in emissions can be attributed to Scope 2 reductions due to both 1) a reduction in community electricity consumption in the residential sector (from 510,000,000 kilowatt hours in 2015 to 502,000,000 in 2017), and 2) an increase in the percentage of electricity in the electrical grid that is generated from renewable sources such as solar (see decline in grid emissions factor described in the Government GHGI section above). The reduction in residential electricity consumption is notable given that the Boynton Beach population increased 1.7% over this time period, from 72,784 in 2015 to 73,992 in 2017. Per capita GHG emissions thus decreased from approximately 12.4 MTCO₂e in 2015 to 12.2 MTCO₂e in 2017.

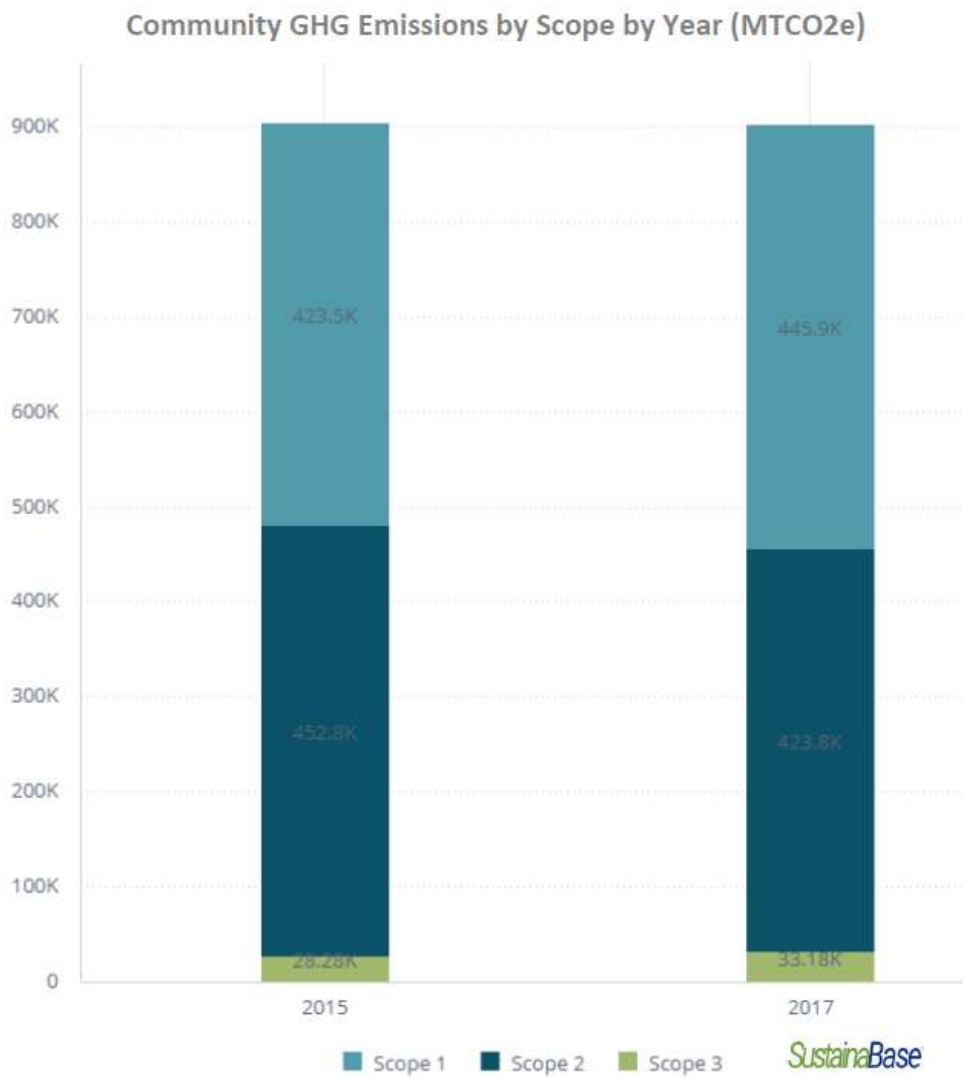


Figure 5. Boynton Beach Community Greenhouse Gas Emissions Inventory results by scope and year.

Emission Reduction Targets

The 2018 special report by the IPCC concluded that, to stave off the most extreme consequences of a warming planet, global GHG emissions must be reduced by 45% from 2010 levels by 2030, and must be net zero (i.e., the amount of GHGs emitted is in balance with the amount sequestered or offset) by 2050.^{xxi} Because it is now the year 2020 and we are using the year 2015 as the baseline for community emissions reduction, we are following ICLEI's recommendation to modify these targets slightly to include an interim goal by 2035 and a long-term goal by 2050.

The GHG emission reduction targets for the City of Boynton Beach are as follows:

- **50% reduction from 2015 levels by 2035**
- **Net zero GHG emissions by 2050**

The emissions projections below illustrate scenarios for meeting the 2035 target of a 50% emissions reduction. Beyond 2035, we anticipate advances in technology, affordability, and climate mitigation policy to facilitate progress toward achieving net zero emissions by 2050.

Government Emissions Projection

As noted, emissions from government operations declined by 14% from 2006 to 2018 as a result of both a reduction in the City's electricity consumption and an increase in FPL's use of solar power in the electrical grid. This decline was steeper than the target set by the City's 2010 Climate Action Plan (27% below 2006 levels by 2035). By 2018, the City had exceeded the CAP 2010 target by 1,182 MTCO_{2e} (5%), demonstrating that an updated, more aggressive reduction target can feasibly be achieved.

Figure 6 plots the measured Government GHGI results (2006, 2015, 2017, 2018) against the target of a 50% reduction below 2015 levels by 2035. The graph also displays two business as usual (BAU) scenarios, representing anticipated emissions that would occur in the absence of any action on the part of the City. Both BAU forecasts were calculated based on the historical trend in the City's electricity use data, but with two different assumptions about FPL's future electrical grid. The yellow dotted line (BAU with FPL Grid Improvement) assumes that FPL will continue to move toward clean energy at the rate they have been since 2006.^{xxii} This BAU projection was calculated by extrapolating the downward trend from 2006–2018 in FPL's emissions factor (the coefficient representing the amount of GHG emissions from FPL's overall fuel mix). The pink dashed line (BAU No FPL Grid Improvement), on the other hand, assumes no change in the fuel mix in FPL's electrical grid going forward. This BAU projection was calculated by holding the emissions factor constant.

The black line in Figure 6, the current trajectory of measured emissions, is close to the target line, suggesting that the target is achievable if we continue to reduce emissions at the rate we have been. As the majority of government emissions come from buildings and facilities, followed by the vehicle fleet, most of the reductions will need to be in these sectors. With the new Town Square development opening in 2020 (including a new City Hall and Library, Cultural Center, Police Headquarters, etc.), it is expected that the City's electricity use will increase in the short term. Thus, extra attention will be needed to ensure we can continue to meet the reduction target.

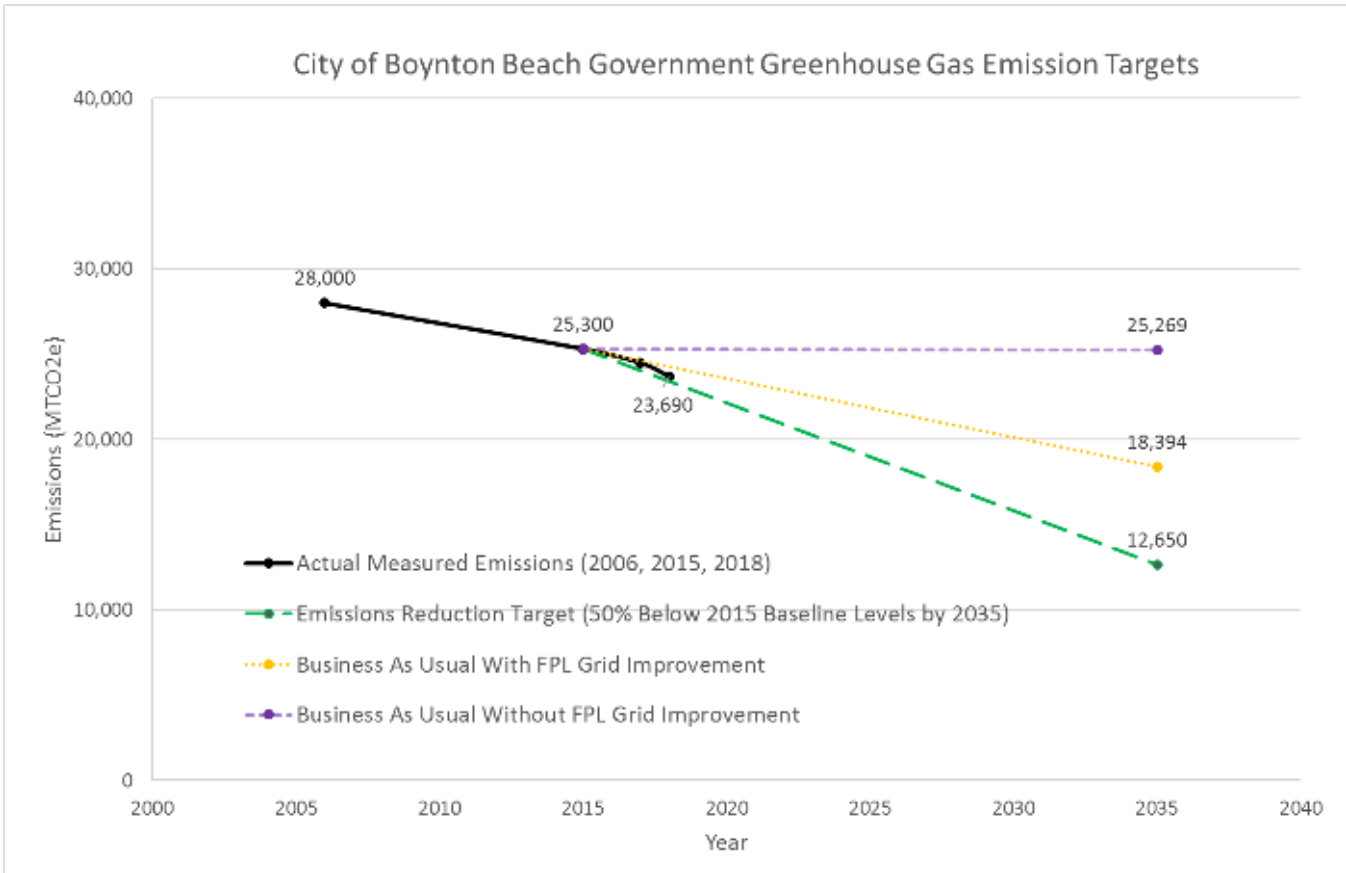


Figure 6. Boynton Beach government emissions target of 50% reduction from 2015 levels by 2035, compared to measured emissions and business as usual scenarios.

Community Emissions Projection

Figure 7 plots the measured Community GHGI results (2015 and 2017) against the target of a 50% reduction below 2015 levels by 2035. The BAU forecasts were calculated based on historical community-wide data combined with the two assumptions about FPL’s grid changes as described above (FPL grid improvement and no FPL grid improvement). Thus far, the measured community-wide emissions, is tracking along the BAU with FPL Grid Improvement forecast. The gap between the black and green lines indicates that achieving the community-wide target will require a sharp increase in activities to reduce GHG emissions. Community emissions are split nearly evenly between transportation and buildings, so mitigation actions need to focus on these sectors.

The next section describes 12 community-wide GHG reduction strategies (and 6 in government operations) that the City plans to implement toward achieving the 2035 and 2050 reduction targets. There are many ways to reduce emissions directly through solar energy, energy efficiency, electric vehicles, etc.; and indirectly by planting trees, preserving greenspace, and purchasing renewable energy credits for off-site solar and wind installations. Moving forward, we will work to quantify GHG reduction potential of select actions to develop a more explicit pathway to meet the community-wide reduction target.

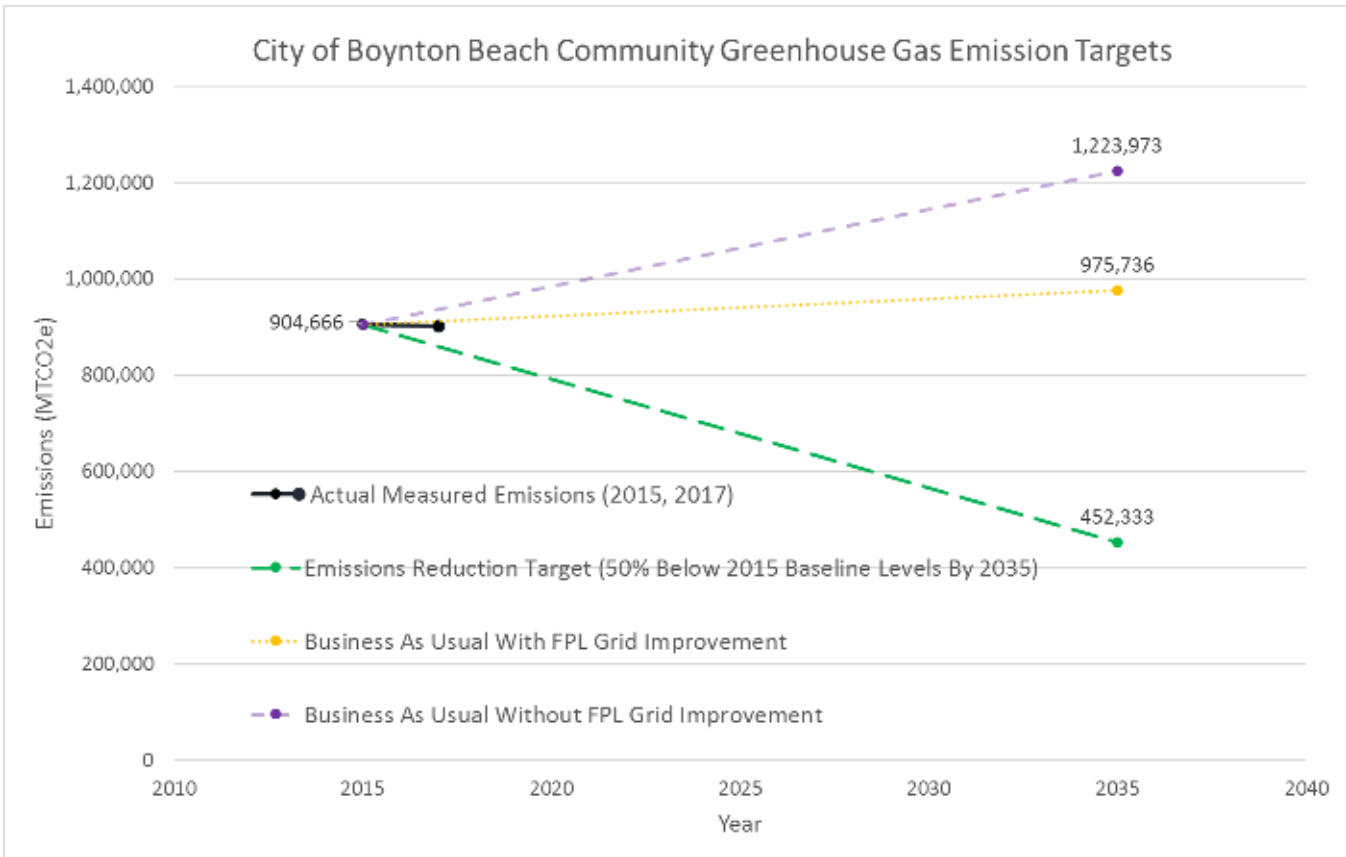


Figure 7. Boynton Beach community-wide emissions target of 50% reduction from 2015 levels by 2035, compared to measured emissions and business as usual scenarios.

GHG Emission Reduction Strategies

The GHG emission reduction strategies are organized according to the structure of the GHGI data, enabling the City to track progress on strategy implementation in direct relation to GHGI metrics. First, the strategies are separated into the two levels of the GHGI: Government Operations and the Boynton Beach Community. Next, within each level, the strategies are broken into three categories that generally align with each scope of emissions, i.e., Scope 1=Transportation, Scope 2=Buildings, and Scope 3=Waste.

GHG Reduction Strategies for Government Operations:

- Scope 1: Transportation (2 strategies)
- Scope 2: Buildings & Facilities (3 strategies)
- Scope 3: Waste (1 strategy)

GHG Reduction Strategies for Boynton Beach Community:

- Scope 1: Transportation & Land Use (6 strategies)
- Scope 2: Buildings (4 strategies)
- Scope 3: Waste & Consumption (2 strategies)

Table 1 provides a general overview of the 18 GHG reduction strategies included in this CAP. The Strategy Implementation Guide (Appendix) provides details about each strategy—including an inventory of City progress to date and a list of specific actions for future implementation. The action items listed in the Appendix will be continually tracked and updated in an interactive online platform as described in the Implementation & Monitoring section below.

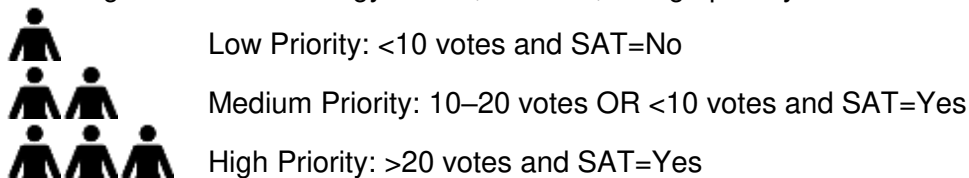
To identify and categorize the GHG reduction strategies in this CAP, we followed the three-step process for prioritizing climate mitigation work developed by the STAR Community Rating System^{xxiii}. In the first step (Identify and Categorize Community Systems for Mitigation), we used a variety of sources to assess and categorize the numerous potential actions our community could take. Sources included the City's original 2010 CAP, the RCAP, the STAR Rating System, and ideas from other cities garnered through the FSDN and SSDN networks. In Step 2 (Identify and Overlay Existing Priorities), we enlisted the Staff Sustainability Committee to filter and augment the draft list of strategies/actions based on their knowledge of existing departmental priorities and initiatives; plans such as the Comprehensive Plan, Strategic Plan, Community Redevelopment Plan, etc.; City Commission and community priorities, and other local conditions that may affect feasibility. In the third step (Identify Secondary Benefits and Narratives), we utilized the Community Engagement processes described earlier to assess the perceived benefits of each action and the topics of highest priority.

For each strategy, Table 1 lists the Strategy Number, Strategy Name, Objective, Responsible Departments, Co-Benefits, Community Priority, and GHG Reduction Potential. Strategy numbers begin

with G (“Government”) or C (“Community”) followed by a prefix (1, 2, or 3) corresponding to the scope of emissions. Each strategy was evaluated for the co-benefits it is likely to produce, which are indicated by the following symbols:



Community priorities were determined based on the SAT priorities and Climate Action Workshop results described earlier. We started with the two action lists from the workshop (government actions and citizen actions) and categorized each action based on the organization of the CAP strategies (G-1.1 through C-3.2). Some actions fell into more than one category (e.g., promoting use of native plants was categorized as both C-1.6 and C-2.3). We then tallied the total number of votes across all actions (both government level and citizen level) within each strategy. Total votes ranged from 1 (G-2.2 and C-1.1) to 56 (C-3.1). We aligned these scores with a “yes/no” indicator of whether the action was identified as a SAT priority. We then categorized each strategy as low, medium, or high priority based on the following rules:



GHG reduction potential was estimated based on contributions of each emissions scope as measured in the GHGI. In the Government GHGI, Scope 2 (Buildings & Facilities) account for the large majority of emissions (72%), so strategies affecting Scope 2 emissions are expected to have high reduction potential. Scope 1 emissions from fleet vehicles have a moderate contribution (20%), while Scope 3 emissions from employee commuting^{xxiv} and waste produce relatively small contributions to overall GHGs. Community-wide emissions are nearly evenly divided between Transportation (46%) and Stationary Energy (i.e., Buildings; 51%), with 3% resulting from the Waste sector. Therefore, GHG reduction potentials are classified as high for strategies in the Transportation & Land Use and Buildings categories, with a few exceptions. Bike & Pedestrian Infrastructure and Transit Enhancement are considered to have medium reduction potential because relatively small populations use these alternative transportation modes. Urban Forestry and Greenspace Preservation are classified as medium because their effect on carbon sequestration is not directly quantifiable in the Community GHGI. The Energy/Water Efficiency & Conservation strategies are also considered medium because they require influencing behaviors of many community members to make a large impact. Finally, Sustainable Lifestyle & Consumption is considered medium, rather than low, reduction potential because it encompasses a range of behaviors that are not all quantified in the GHGI. Based on this analysis, the following symbols are used to represent GHG reduction potential:

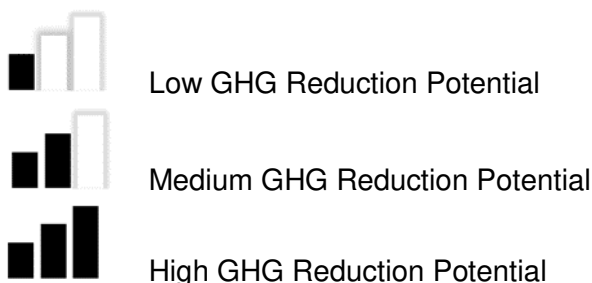
















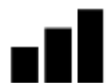


























Table 1. Summary of Greenhouse Gas Reduction Strategies.

Strategy Number	Strategy Name	Objective	Responsible Departments*	Co-Benefits	Community Priority	GHG Reduction Potential
Government Scope 1: Transportation						
G-1.1	Green Fleet	Implement a green fleet policy including purchase of fuel-efficient vehicles, fleet electrification, and strategies for efficient vehicle use and operation.	PW, UT, PD, FD, GO, RP, CS	 		
G-1.2	Employee Commute Reduction	Promote employees' use of diverse transportation modes to reduce single-occupant vehicle travel, including carpooling, electric vehicles, walking, biking, and public transit.	HR, ITS, LI	 		
Government Scope 2: Buildings & Facilities						
G-2.1	Building Efficiency	Retrofit existing government buildings to optimize energy and water efficiency, and build new facilities to energy-efficient standards.	PW, DV	 		
G-2.2	Water Infrastructure Efficiency	Manage and upgrade water and wastewater infrastructure to maximize operational efficiency, reduce system water loss, reduce energy use, and conserve water supplies.	UT, WW	  		
G-2.3	Renewable Energy in Government Facilities	Install solar panels on City buildings, utilize solar energy and energy storage technologies for emergency management and disaster recovery, and consider purchasing renewable energy credits for off-site production.	PW, UT, FI	 		
Government Scope 3: Waste						
G-3.1	Green Office Practices	Reduce waste, increase recycling, and develop sustainable procurement practices in City government.	PW, ITS, FI	  		

Strategy Number	Strategy Name	Objective	Responsible Departments*	Co-Benefits	Community Priority	GHG Reduction Potential
Community Scope 1: Transportation & Land Use						
C-1.1	Compact & Mixed-Use Development	Concentrate development in compact, human-scaled, walkable centers and neighborhoods that connect to public transit, offer diverse uses and services, and provide a variety of housing options.	DV, CRA			
C-1.2	Bike & Pedestrian Infrastructure	Expand, connect, and complete networks of bicycle and pedestrian facilities, including those supporting access to transit.	PW, DV, RP			
C-1.3	Electric Vehicle Infrastructure	Expand electric vehicle charging infrastructure and promote community use of electric vehicles.	PW, DV			
C-1.4	Transit Enhancement	Support the development of new transit options and increase the use of existing transit as a transportation mode for the movement of people in the City.	ED, CRA			
C-1.5	Urban Forestry	Maintain and enhance the urban tree canopy to sequester carbon and provide multiple other ecosystem services.	PW, DV, RP, GO, PA			
C-1.6	Greenspace Preservation	Protect and restore natural ecosystems and open spaces within the City to sequester carbon and provide multiple other ecosystem services.	PW, DV, RP, GO, PA			
Community Scope 2: Buildings						
C-2.1	Green Building Standards	Adopt green building standards to guide decision-making and development and to provide an incentive for better location, design, and construction of residential, commercial, and mixed-use developments and redevelopment.	DV, PA			

Strategy Number	Strategy Name	Objective	Responsible Departments*	Co-Benefits	Community Priority	GHG Reduction Potential
C-2.2	Energy Efficiency & Conservation	Advance energy efficiency and conservation throughout the Boynton Beach community through technological solutions, policies, financial incentives, and educational programs.	DV			
C-2.3	Water Efficiency & Conservation	Advance water efficiency and conservation throughout the Boynton Beach community through technological solutions, policies, financial incentives, and educational programs.	UT, DV			
C-2.4	Renewable Energy Planning & Promotion	Promote community access to and adoption of renewable energy through education, incentives, permitting processes, zoning codes, partnerships, and advocacy.	DV			
Community Scope 3: Waste & Consumption						
C-3.1	Waste Reduction & Recycling	Reduce, reuse, and recycle material waste produced in the community.	PW, RP			
C-3.2	Sustainable Lifestyle & Consumption	Build a sustainability movement in Boynton Beach and engage the community around lifestyle actions to reduce the carbon footprint.	PC			

* These City departments will be primarily responsible for implementing the strategies in collaboration with the Office of Sustainability. CRA=Community Redevelopment Agency, CS=Community Standards, DV=Development, ED=Economic Development, FD=Fire Department, FI=Finance, GO=Golf Course, HR=Human Resources & Risk Management, ITS=Information Technology Services, LI=Library, PA=Public Arts, PC=Public Communications & Marketing, PD=Police Department, PW = Public Works, RP=Recreation & Parks, UT = Utilities, WW=Wastewater Treatment Plant

Implementation & Monitoring

Progress toward meeting CAP objectives is continually advancing as the Office of Sustainability coordinates numerous initiatives across City departments with support of the City Commission, the Sustainability Advisory Team, and partner organizations. The Strategy Implementation Guide (Appendix) includes a comprehensive summary of the City's progress to date and planned future actions for each of the 18 GHG reduction strategies. These details are continually changing as the City completes the listed actions and refines them based on new information, technologies, policies, and priorities. Thus, the information included in the Appendix is intended to be a living document.

Funding for CAP actions is determined on a project-by-project basis. Currently, funding for sustainability in governmental operations comes from multiple sources including the Utilities Administration budget, the City Capital Improvement Program (CIP), and the Utilities CIP. We will continue to integrate energy and water efficiency into the CIP review process to ensure that sustainability is a standard design consideration in all capital projects. We will also explore the possibility of using novel funding mechanisms such as ESCO partnerships, performance contracting, and financing through green banks. The City's sustainability networks, including CDP, ICLEI, GCoM, and FSDN, offer guidance on best practices for financing climate action.

Community-wide GHG reduction initiatives are also supported through City incentives and funding mechanisms. The City offers Property Assessed Clean Energy (PACE) financing to residents and businesses for energy efficiency, renewable energy, and wind resistance upgrades. The Green Building/Sustainable Community Fund has provided more than \$74,000 in rebates for energy efficiency improvements through the Energy Edge Rebate Program. The fund's allowable uses were recently expanded to include renewable energy, electric vehicle infrastructure, bicycle/pedestrian facilities, transit options, waste-reduction activities, green infrastructure, and educational activities (Ordinance No. 19-011). In addition, the City takes advantage of grant opportunities from federal, state, local, and private funders to support City and community-wide climate action. Examples of grant-funded projects include energy-efficient retrofits of City facilities, "Complete Streets" improvements, and tree canopy enhancement.

Since 2015, the City has contracted with a local consulting company, SustainaBase LLC, to conduct the City's GHGIs and track results in their proprietary online platform of the same name. They have customized the platform to meet the City's needs, and will continually update the data to enable staff to analyze emissions by year, scope, sector, and resource—and even down to the level of specific City facilities and assets. The GHG emission reduction targets presented in this CAP will be integrated into SustainaBase, providing a dynamic tool for monitoring annual emissions in relation to near-term and long-term targets. The Office of Sustainability will report progress on CAP implementation and GHG emission reductions to City Commission on an annual basis. In addition, the City will continue to report emissions annually via CDP's public platform to fulfill our commitment to the Global Covenant of Mayors for Climate and Energy.

The next step is to transform the Strategy Implementation Guide included in the Appendix into an interactive plan hosted on an online platform. The Sustainability Coordinator is working with SustainaBase and ICLEI's ClearPath™ tools to develop a framework for updating the action plan and tracking progress on government-level and community-level implementation measures. Because we have structured this CAP in alignment with the levels and scopes of GHGI data, the plan can be monitored in direct relation to GHGI metrics. Progress on implementing CAP actions and meeting the GHG reduction targets will be continually tracked and communicated to City leaders and the Boynton Beach community.

ⁱ The Fourth National Climate Assessment, Chapter 2: Our Changing Climate; Key Message 1: Observed Changes in Global Climate. <https://nca2018.globalchange.gov/chapter/2/>

ⁱⁱ National Oceanic and Atmospheric Administration (NOAA) "July 2019 was hottest month on record for the planet" updated August 15, 2019. <https://www.noaa.gov/news/july-2019-was-hottest-month-on-record-for-planet>

ⁱⁱⁱ National Aeronautics and Space Administration (NASA) 2018. Goddard Institute for Space Studies, "GISS Surface Temperature Analysis (GISTEMP): Global-mean monthly, seasonal, and annual means," last updated February, 2018. https://data.giss.nasa.gov/gistemp/tabledata_v3/GLB.Ts.txt

^{iv} Union of Concerned Scientists "Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days" July 2019. <https://www.ucsusa.org/sites/default/files/attach/2019/07/killer-heat-analysis-full-report.pdf>

^v Climate Central, "Hurricanes and Climate Change: What We Know," September 6, 2017. <http://www.climatecentral.org/gallery/graphics/hurricanes-and-climate-change-what-we-know>; Climate Central, "Warmer Air Means More Evaporation and Precipitation," September 6, 2017. <https://www.climatecentral.org/gallery/graphics/warmer-air-means-more-evaporation-and-precipitation>

^{vi} WRLN "Is Climate Change Fueling More Intense, Stalling Hurricanes?" September 6, 2019. <https://www.wlrn.org/post/climate-change-fueling-more-intense-stalling-hurricanes-0>

^{vii} The Fourth National Climate Assessment, Chapter 19: Southeast; Key Message 2: Increasing Flood Risks in Coastal and Low-Lying Regions. <https://nca2018.globalchange.gov/chapter/19/>

^{viii} Unified Sea Level Rise Projection, Southeast Florida Regional Climate Change Compact, 2019.

^{ix} IPCC Special Report: Global Warming of 1.5°C. <https://www.ipcc.ch/sr15/>

^x United Nations Framework Convention on Climate Change. The Paris Agreement. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

^{xi} United Nations Climate Action Summit closing release, September 23, 2019. https://www.un.org/en/climatechange/assets/pdf/CAS_closing_release.pdf

^{xii} Security and Sustainability Forum 2019. Climate Action Planning: Creating Low-Carbon, Resilient Communities. Webinar. August 7, 2019. In partnership with Island Press and Cadmus. <https://ssfonline.org/climate-action-planning-10334>

^{xiii} Deng, H., Liang, Q., and Anadon, L.D. 2017. Co-benefits of greenhouse gas mitigation: a review and classification by type, mitigation sector, and geography. Environmental Research Letters 12: 123001. <https://doi.org/10.1088/1748-9326/aa98d2>

^{xiv} Headwaters Economics: Populations at Risk Report. <https://headwaterseconomics.org/tools/populations-at-risk/>

^{xv} Southeast Florida Regional Climate Change Compact: Social Equity. <https://southeastfloridaclimatecompact.org/recommendation-category/eq/>

^{xvi} Climate Action through Equity: The Integration of Equity in the Portland and Multnomah County 2015 Climate Action Plan. <https://www.adaptationclearinghouse.org/resources/climate-action-through-equity-the-integration-of-equity-in-the-portland-and-multnomah-county-2015-climate-action-plan.html>

^{xvii} United States Environmental Protection Agency: Sources of Greenhouse Gas Emissions.

<https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

^{xviii} California Air Resources Board, et al. "Local Government Operations Protocol For the Quantification and Reporting of Greenhouse Gas Emissions Inventories" Version 1. May 2010.

https://s3.amazonaws.com/icleiusaresources/lgo_protocol_v1_1_2010-05-03.pdf

^{xix} World Resources Institute, et al. Greenhouse Gas Protocol "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories An Accounting and Reporting Standard for Cities". 2014.

https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf

^{xx} Note that the scope totals in Figure 6 are rounded numbers.

^{xxi} IPCC Special Report: Global Warming of 1.5°C. <https://www.ipcc.ch/sr15/>

^{xxii} FPL announces groundbreaking '30-by-30' plan to install more than 30 million solar panels by 2030, making Florida a world leader in solar energy. January 16, 2019. <http://newsroom.fpl.com>

^{xxiii} Climate Change Mitigation & Adaptation: Using the STAR Community Rating System to prioritize planning and make decisions. <http://www.starcommunities.org/download-the-star-climate-change-guide/>

^{xxiv} Emissions from employee commuting are categorized as Scope 3 in the GHGI because they do not always occur within the City boundary. For simplicity, employee commuting is included in the Government Scope 1-Transportation category of the CAP.