



Rethink Paradise:

WEST PALM BEACH

Sustainability Action Plan

Cover photo: Catalfumo Construction and Development

Rethink Paradise:
WEST PALM BEACH
MAYOR'S MESSAGE
Mayor Jeri Muoio
April 2012



Dear Friends,

I'm pleased to present Rethink Paradise: West Palm Beach, a Plan to guide our City and community toward a sustainable future. Global evidence is mounting that climate change is a reality and may represent the greatest challenge to West Palm Beach's well-being in the coming years. Scientific and government communities recognize that sea level rise and other Climate Change impacts will be formidable opponents to our way of life in South Florida with potential threats to our energy and water availability and infrastructure. The depth and breadth of this problem are balanced only with the vast opportunity to embrace innovation and to 'rethink' our community's culture as we prepare for the future.

'Rethink Paradise: West Palm Beach, Sustainability Action Plan' is based on the premise that Sustainability and Climate Change actions can be framed through the 'Triple Bottom Line' principle of People, Planet, Profit. This concept encourages the notion that everything is connected, and with each of the elements in balance, each will prosper. We West Palm Beachers do not need to reduce our quality of life to combat Climate

Change, but we do need to change our culture and the way we live.

The 'Rethink Paradise' Action Plan provides measures that can reduce Green House Gas Emissions (GHGE) while also delivering positive financial and social benefits. We must shift our thinking and actions from wasteful consumption to thoughtful conservation of our resources while actively looking for and implementing innovative solutions. First, the City must lead by example by identifying and improving City government operations – many of these initiatives are well underway such as implementation of an Energy Performance Contract which seeks to reduce GHGE by over 11 million lbs of CO₂ and save an estimated \$2.3 M. The 'Rethink Paradise' Action Plan includes GHGE reduction targets for City facilities and operations of 19% by 2018, 32% by 2025 and 37% by 2035.

However, as you can see from our GHGE Baseline, City government can only do a small part of what is needed community wide to reach our goals - everyone must contribute and everyone must benefit. Together, we must address: Conservation and

protection of our lands, Energy efficiency and alternative energy, Land use and redevelopment, Sustainable buildings, Reduction of waste, and Growing a green economy.

We also must reach out with an unwavering commitment to our friends and neighbors, our businesses and visitors, whether the most vulnerable or the most successful, to ensure everyone has the opportunity to add their voice and to participate as we tackle this formidable challenge of Climate Change.

I look forward to working with you to 'Rethink Paradise' as we implement this plan, so that our children and their children may enjoy all the beauty, wonder and prosperity that our great city has to offer ... ensuring West Palm Beach's vibrancy and leadership in the 21st century and beyond.

Sincerely,

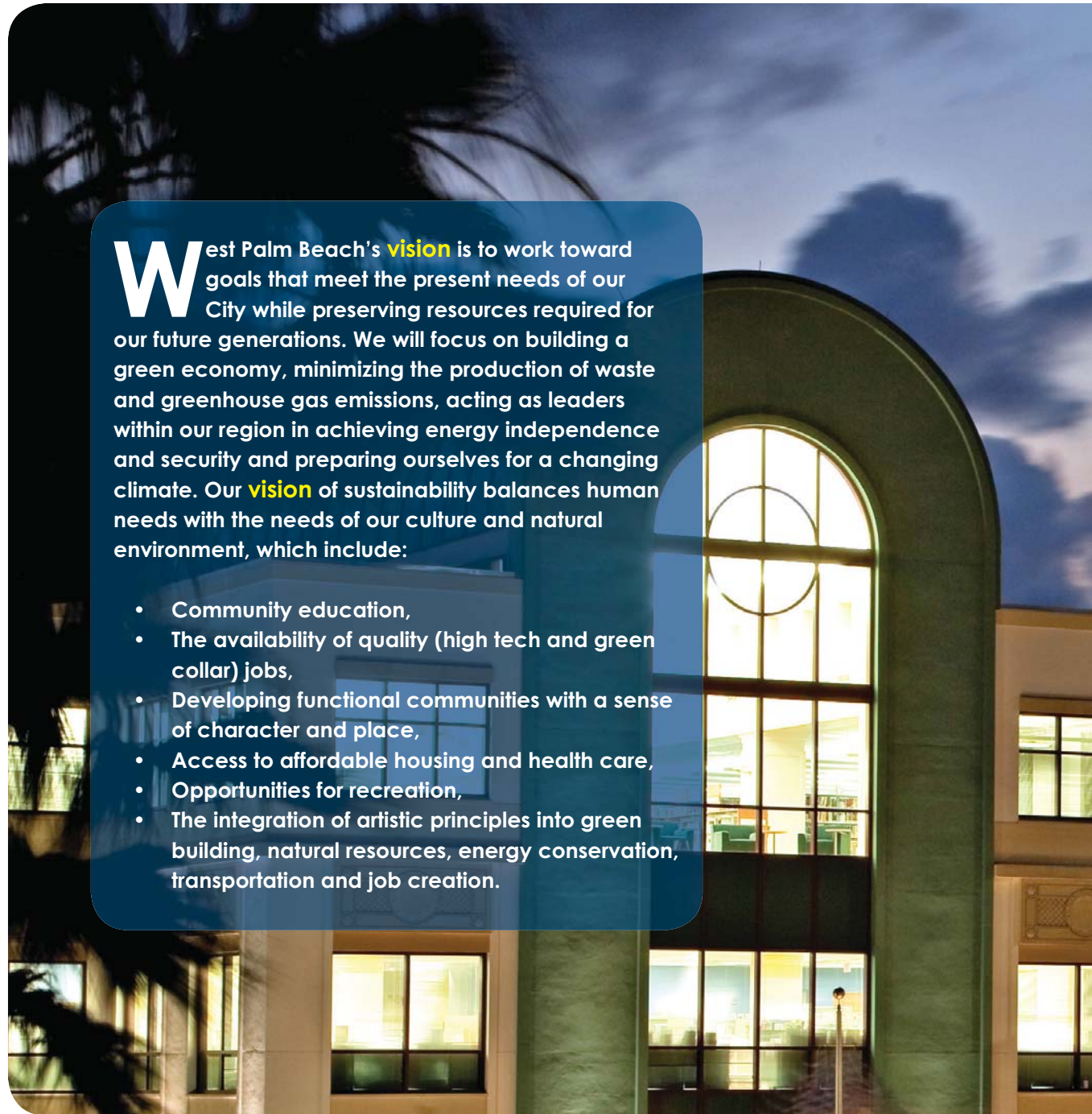
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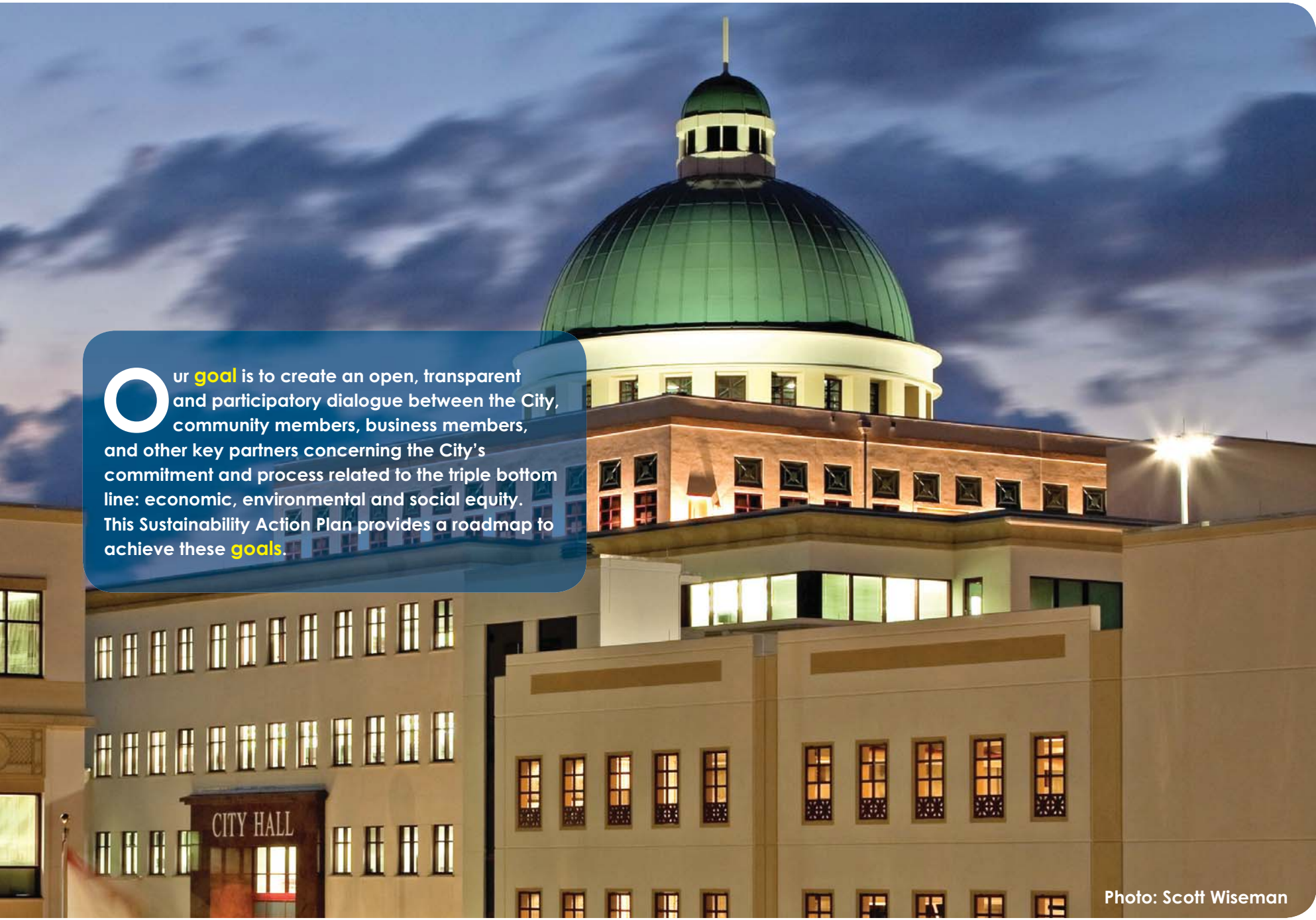
Rethinking Paradise for a
Green City, a Community Wide
Sustainability Plan



West Palm Beach's **vision** is to work toward goals that meet the present needs of our City while preserving resources required for our future generations. We will focus on building a green economy, minimizing the production of waste and greenhouse gas emissions, acting as leaders within our region in achieving energy independence and security and preparing ourselves for a changing climate. Our **vision** of sustainability balances human needs with the needs of our culture and natural environment, which include:

- Community education,
- The availability of quality (high tech and green collar) jobs,
- Developing functional communities with a sense of character and place,
- Access to affordable housing and health care,
- Opportunities for recreation,
- The integration of artistic principles into green building, natural resources, energy conservation, transportation and job creation.





Our **goal** is to create an open, transparent and participatory dialogue between the City, community members, business members, and other key partners concerning the City's commitment and process related to the triple bottom line: economic, environmental and social equity. This Sustainability Action Plan provides a roadmap to achieve these **goals**.

CITY HALL

Photo: Scott Wiseman

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Overview



“Meeting the needs of the present without compromising the ability of future generations to meet their own needs”

Source: UN, Brundtland Commission, Report of the World Commission on Environment and Development, 1987

With fossil fuel use and resulting greenhouse gas (“GHG”) emissions being the primary drivers of global climate change, the reasons for launching a sustainability program are clear. But, the City also recognizes the quality of life and economic benefits of becoming more sustainable which are also contributing factors to the development of this Sustainability Action Plan (“SAP”). The City of West Palm Beach (“WPB”) has a shared, collaborative responsibility for becoming a sustainable city. WPB recognizes the benefits of initiating a comprehensive approach to sustainability. The SAP is a “roadmap to sustainability” cutting across all City Departments and Divisions as well as outlining strategies for the community to become more sustainable too.

Borne out of first e4 Sustainability Summit, the concept for a SAP has long been a goal of the City. At the first e4 Summit, the City spent time with participants to begin to organize “opportunities” and “challenges” in developing and implementing a comprehensive sustainability program for WPB. Many of those insights are captured in this SAP.

To develop the SAP, the City completed a GHG inventory for City Facilities and Operations as well as the overall community reflecting a baseline energy use for the year 2008.

Because the City directly controls its energy use, the SAP sets a target to reduce GHG emissions for only City Facilities and Operations at this time. That target is a 19% reduction in GHG emissions by 2018, a 32% reduction by 2025 and a 37% reduction by 2035. In addition to this GHG reduction target, the SAP includes forty (40) goals in the seven (7) Focus Areas to achieve additional communitywide GHG reductions. The GHG Inventory is not the only basis for development of the SAP. In addition, the City’s Green Task Force, additional outreach efforts which included stakeholder interviews and a workshop, an internal survey, and research of best practices within Florida and across the country have also factored into the formulation of the SAP. The SAP also assesses all of the existing sustainability-related initiatives in the City and builds upon those efforts as well.

Not all of the goals can be translated into a specific target that can be quantified in a numeric GHG reduction, so trends are also established where appropriate. Indicators are also identified for the goals in an Implementation Strategy as a measurement of progress. As more information becomes available to quantify the communitywide goals, it will be incorporated into the SAP in the future.

The SAP recommended actions will:

1. Make our homes and businesses more energy efficient and encourage

- renewable energy to reduce reliance on fossil fuels.
2. Conserve and protect our natural resources including Grassy Waters Preserve, our urban trees and water supply.
 3. Assure that the development and redevelopment of facilities include more transportation options including increased access to alternative modes of transportation such as bicycling and public transit.
 4. Incentivize construction that is energy efficient, reduces waste, recognizes the unique character of many of our existing buildings and promotes the integration of cultural and artistic principles through the use of EcoArt.¹
 5. Reduce the volume of waste we generate and increase our recycling opportunities.
 6. Grow a “Green Economy” by increasing jobs and providing opportunities for our businesses to save money and become more efficient.
 7. Provide access to healthy locally grown food and create new markets for businesses to feature those products.

1. EcoArt (ecological art) melds aspects of environmental art, activist art and community animation/mobilization art with engineering and science-originated processes of restoration of damaged ecosystems. EcoArt features site-specific interventions aimed at political, social, ecological and geographical realities and contexts that have resulted in environmental degradation; and brings the causes of environmental degradation (and approaches to addressing them) greater visibility. The goal is public commitment to effective and responsible environmental stewardship.



FOCUS AREAS FOR COMMUNITYWIDE GHG REDUCTIONS:

1 Natural Resources & Water Conservation

2 Energy Efficiency & Renewable Energy

3 Land Use, Redevelopment & Transportation

4 Sustainable Buildings & Housing

5 Waste Management & Recycling

6 Growing a Green Economy

7 Urban Agriculture & Community Gardens

Introduction



Source: earthadventure.org

What is Sustainability?

Current trends in society highlight increasing levels of population and consumption and decreasing natural resources and ecosystems including forests, water, wildlife, and soils. At some point the population and increasing consumption will be greater than the ecosystems that support life. "Sustainable" actions are those that work toward reducing the demands and consumption of our ecosystems and also work toward preserving and restoring our forests, water, wildlife, and soils. "Sustainability" is "meeting the current environmental, social, and economic needs of our community without compromising the ability of future generations to meet these needs".¹ In other words, the goal of sustainability is to act environmentally

responsibly while remaining economically efficient and socially progressive. Sustainability is referred to as a whole systems approach addressing the environment, social equity, and the economy, traditionally known as the three (3) "E's" or the "triple bottom line." Because of the importance of energy use and conservation in the context of sustainability, WPB takes this concept a step further with "e4" which is also the theme of its annual Sustainability Summit.

As both consumers and stewards of our natural resources, the City has a special responsibility to reduce its consumption of fossil fuels and harmful chemicals, lessen the impacts to our natural environment, and make sure that our citizens' needs are met fairly, efficiently, and cost effectively.

A banner for the City of West Palm Beach Sustainability Summit. The top part features a large green 'e' with a '4' next to it, followed by the text 'environment economics equity energy'. Below this is a photograph of footprints in sand. The bottom part of the banner has a green background with the City of West Palm Beach logo on the left, which includes the text 'CITY OF WEST PALM BEACH' and 'SUSTAINABLE INITIATIVES'. To the right of the logo, the text reads 'THE CITY OF WEST PALM BEACH' in a smaller font, followed by 'SUSTAINABILITY SUMMIT' in large, bold, white letters, and '• RETHINKING PARADISE FOR A GREEN CITY •' in a smaller font below it.

e⁴ environment economics equity energy

THE CITY OF WEST PALM BEACH

SUSTAINABILITY SUMMIT

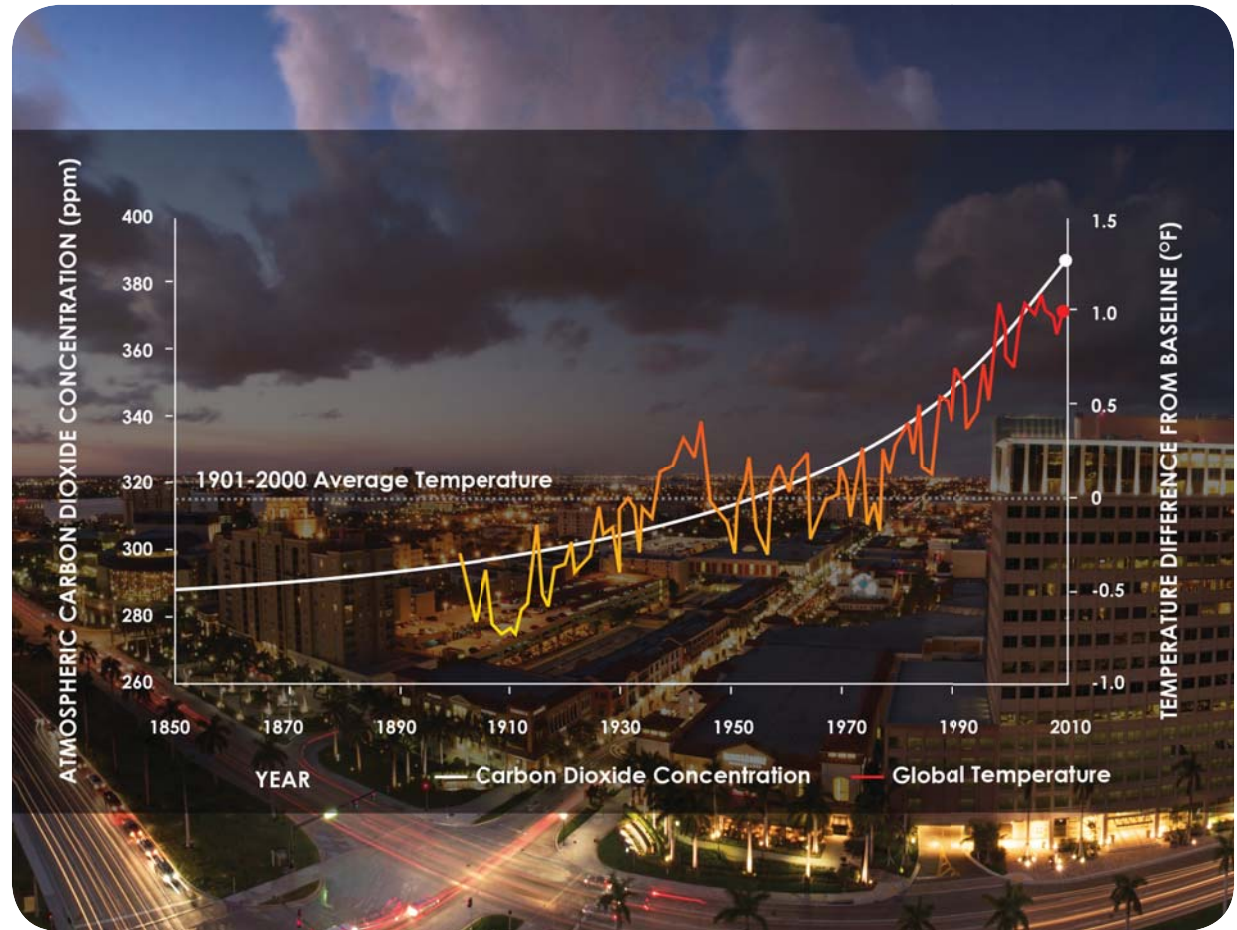
• RETHINKING PARADISE FOR A GREEN CITY •

A Changing Climate.

The EPA defines “greenhouse effect” as a general warming effect felt on Earth’s surface produced by GHGs. This process occurs naturally and has kept the Earth’s temperature about 60 degrees Fahrenheit warmer than it would be otherwise. The greenhouse effect is important; without it, the Earth would not be warm enough for humans to live. Most climate scientists think that human activity, such as burning fossil fuels, deforestation and certain changes to land use are causing an increase in GHGs in the Earth’s atmosphere. The increased GHGs lead to warming in general as well as greater variability and lower predictability of severe weather. Climate change has never been stronger.

Role of Cities in Climate Change.

While GHGs produced within the City of West Palm Beach constitute only a small fraction of national and global quantities, the future economy and the City’s desire to be a premier destination requires the City to have a vested interest in demonstrating leadership on these critical issues. The City is on the front lines of climate change impacts such as sea level rise and increased hurricane intensity. Recognizing the need to simultaneously mitigate GHGs attributable to energy use and prepare for the gradual, but accelerating, impacts of climate change, the City has already proactively taken several actions.



The Link Between Greenhouse Gases and Temperature, 1850-2009

Source: Carbon Dioxide Information Analysis Center, 2010. <http://cdiac.ornl.gov/> and National Oceanic and Atmospheric Administration, 2010. www.noaa.gov

Local governments throughout the country have stepped up to demonstrate leadership on climate policy amidst federal inaction. Cities play an integral role in advancing sustainability, not only because they are contributors to climate change, but also because they are increasingly challenged

to control costs associated with energy use. Numerous local governments in the U.S. have enacted energy conservation and efficiency measures along with GHG emissions reduction plans to address the global dimensions of energy problems that extend far beyond their borders. The powers



the NATURAL STEP

1

Reduce our dependence upon fossil fuels, extracted underground metals and minerals.

2

Reduce our dependence on chemicals and other manufactured substances that can accumulate in nature.

3

Reduce our dependence on activities that harm life sustaining ecosystems.

4

Meet the hierarchy of present and future human needs fairly and efficiently.

of local governments, especially over land use, make them well suited to play a lead role in sustainability and energy management. Local governments can contribute a great deal to U.S. climate change mitigation by reducing emissions within already well-accepted domains of authority. Coastal and waterfront communities must be ready to respond to and rebound from hazards created by weather and climate. The uncertainty about exactly how the climate will change should not stop communities from acting to protect property and lives.

By virtue of the City's population density, significant public infrastructure, and large, diverse stock of existing buildings, West Palm Beach ("WPB") provides tremendous opportunity for sustainable living and development. City living demonstrates sustainability by reducing the need for automobiles, reusing infrastructure, and recycling existing buildings. A "green" city enjoys significant health, infrastructure, and economic advantages. Increased tree coverage, local food systems, availability of recreational spaces, and healthy ecosystems are key components to creating a greener WPB. There are many ways that energy creating and energy saving technologies can be made aesthetically interesting and visually educational by integrating principles of EcoArt into the process at the very beginning of the design phase. The SAP will integrate all of these principles into its recommendations.

The Planning Process

There are many approaches to creating a sustainability plan, and through the development of Focus Areas and from a recommendation of the Green Task Force, the City's Sustainability Action Plan ("SAP") draws from The Natural Step process.ⁱⁱ The Natural Step's system conditions define the framework through which City programs and practices can be reviewed and modified in order to become more sustainable.

An eco-municipality is defined as a city, town, county, or region that aspires to develop an ecologically, economically, and socially healthy community for the long term, using The Natural Step framework for sustainability as a guide, and a democratic, highly participative development and decision-making process as the method. In its simplest form, the SAP is



Figure 1. Approach to the Planning Process

employing a straightforward “ABCD” approach:

- A. Raising **Awareness** of sustainability;
- B. Creating a City and communitywide **Baseline** of information about energy consumption, an inventory of GHG and existing City initiatives and new sustainable projects and programs;
- C. Creating a **Compelling** future vision for clear City and communitywide guidance; and
- D. **Developing** a Sustainability Action Plan which addresses community wide issues while also highlighting city government controlled actions and aggressively implementing it.

Developing the SAP is critical to the City’s long-term success because it helps raise awareness of sustainability, works to integrate the goals and targets across departments within the City and the community, and helps to develop a common language and shared understanding. This approach planning process should reduce the likelihood of conflict and competition among individual actions and avoid duplication of efforts.



THE GREENHOUSE EFFECT

The sun's radiation combined with accumulation of greenhouse gases causes a warming of the Earth's surface.

REFRACTION

Solar radiation hits the Earth's oceans and the atmosphere and some of the radiation is reflected back to space.

EMISSION SOURCES OF GREENHOUSE GASES

Carbon dioxide (CO₂) is a result of burning fossil fuels (ie. automobiles, factories). Other greenhouse gases come from reactions between chemicals or the natural breakdown of organic material.

SURFACE HEATING

The land area on Earth acts like a sponge to soak up about half of the solar radiation coming through the atmosphere.

Climate change remains a complex and ever-changing topic for scientists, governments and the news media. Whether you are talking about greenhouse gases, carbon emissions, or global warming, it all relates to climate change. What is climate and why is it changing? The term climate differs from weather in that climate represents the average weather conditions (temperature, humidity, wind, rain) in a certain place over a period of several years or decades. The notion of climate change is also nothing new. The earth has experienced several ice ages and warming periods throughout its history and scientific evidence indicates the Earth is getting warmer as average temperatures increased more than 1 degree Fahrenheit over the last 100 years and are expected to be 2 degrees Fahrenheit warmer by

2060. As populations grow and shift, increasing energy/water needs, land use changes, pollution and possible warming due to greenhouse gasses will impact climate change predictions.

One of Florida's greatest threats associated with a changing climate is sea level rise. Per South Florida Water Management District (www.sfwmd.gov), by 2060, the water surrounding Florida's coastlines are projected to rise between 5 to 20 inches from current levels. This can have devastating effects on our built environment including water and sewer infrastructure, coastal erosion leading to property loss, and salt water intrusion into our drinking water supply. In addition to sea level rise the South Florida region will likely experience a change

CLIMATE CHANGE

POWER OF THE SUN

The sun provides the Earth with several essential components which make life on Earth possible. The sun is also the engine that powers our climate.

BENEFITS OF NATURALLY OCCURRING GREENHOUSE GASES

The greenhouse gases in our atmosphere also act as an insulator, retaining heat to keep the Earth about 60°F warmer than it would be without this atmospheric blanket.

RADIATE

Just as the Earth absorbs infrared radiation, it also emits this radiation as the Earth's surface warms.

in rainfall and evaporation patterns which could have devastating effects. Extreme weather will foster stronger hurricanes, prolonged droughts, increased flooding of properties and local saltwater estuaries.

Per US Fish and Wildlife Service (www.fws.gov), a growing body of evidence has linked accelerating climate change with observed changes in fish and wildlife, their populations, and their habitats in the United States. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report estimates that approximately 20-30 percent of the world's plant and animal species assessed as of 2006 are likely to be at increasingly high risk of extinction as global mean

temperatures exceed a warming of 2 – 3°C above preindustrial levels. The IPCC also reports that the resilience of many ecosystems around the world is likely to be exceeded this century by an unprecedented combination of climate change; disturbances associated with climate change, such as flooding, drought, wildfire, and insects; and other global change-drivers, including land-use changes, pollution, habitat fragmentation, urbanization, and growing human populations and economies. Climate change has the potential to cause abrupt ecosystem changes and increased species extinctions. This information and Sustainability Action Plan is a call to action, impossible to ignore.

History and Approach to the Sustainability Action Plan



In 2006, the Legislature passed the Florida Energy Act, creating the Florida Energy Commission ("FEC"), renewable energy grants, and a solar rebate program, among other things, and in 2007, Governor Charlie Crist signed a series of executive orders aimed at reducing greenhouse gas emissions and establishing an Action Team on Energy and Climate Change.ⁱⁱⁱ Other legislation was passed in 2007 directing the Florida Building Commission to create a model green building ordinance and in 2008 legislation was passed directing local governments to include GHG reduction strategies into the Local Government Comprehensive Plans. Legislation was also passed in 2008 requiring municipal governments and state agencies to construction new buildings to a recognized green third party rating system such as the U.S. Green Building Council's Leadership in Energy & Environmental Design ("LEED") or those created by the Florida Green Building Coalition. In the same year, legislation passed requiring the Florida Building Code to become significantly more energy efficient as compared to the requirements in the 2007 version of the Code. In 2010, major bills passed providing authority to local governments to create energy financing and retrofitting programs and the state's recycling targets were revised to become more aggressive.

At the City level, the Office of Sustainability was established in 2008 to enhance the viability of WPB as a modern model of healthy, environmentally progressive and

ecologically sustainable urban living. Additionally, a City Green Team made up of representatives from all City departments was created to act as liaisons to the Office of Sustainability to enhance knowledge, understanding and communications throughout all levels of City government. The City also received an Energy Efficiency Conservation Block Grant ("EECBG") Award of \$1,088,000 to be used for:

1. Energy Performance Contract aimed at reducing energy consumption and cost savings, infrastructure improvements and financing sources for implementation of recommended strategies.
2. Energy efficiency/conservation measures in support of LEED technologies to the Waterfront Green Pavilion and Educational Conservation Kits/Programming.
3. Photovoltaic panels on Waterfront Green Pavilion.
4. Differential for Electric Vehicle upgrades for five (5) replacement vehicles and installation of seven (7) electric vehicle charging stations, five (5) of which were dedicated for City fleet charging and two (2) chargers provided for public charging.

The City established the City Green Task Force which met for two (2) years and produced a recommendations document in June of 2010. Various Sub-Committees were formed including Green Building, and as

part of the development of the Green Task Force Recommendations, the Planning and Zoning Department worked with their Urban Agriculture and Community Gardens Sub-Committee to increase local availability of fresh, nutritious foods within the City through the establishment of a pilot community and urban farms program. In October 2010, the City passed Ordinance 4298-10 creating the Sustainability Advisory Committee. The Public Utility Department also initiated an Asset Management planning process for the Utility Department and held its e4 Summits in the spring of 2009, 2010 and 2011. As individual staff and departments continued to search for ways to conserve energy, reduce environmental impacts, and save on costs to the taxpayer, the need for a Sustainability Action Plan ("SAP") establishing a baseline for monitoring, recording current efforts toward sustainability, identifying new projects and programs, and helping to prioritize where the City should focus their efforts became obvious.

The purpose of the SAP is to create an open, transparent and participatory dialogue between the City, community members, business members, and other key area partners concerning the City's commitment and process to implement factors related to the triple bottom line: economics, environment and social equity. The success of our city rests in the coordination and cooperation between public, private and nonprofit organizations, and community members. By implementing sustainable practices, the City will improve the community's



quality of life, and work to retain and attract more residents and businesses. The City must lead the effort to engage all segments of the community—residents, businesses, institutions, and government—in working together and taking responsibility for reducing GHG emissions, participating in climate planning and policy development, and adopting a longer-range perspective that will help the City to adapt as knowledge of climate change grows. The SAP represents a crucial step in moving this broad agenda forward, but in many ways it is still a first step. The results of developing the SAP itself are valuable because they include: raising awareness about sustainability in the City, establishing a baseline for various efforts and activities, developing the compelling vision for the City and laying out the action steps and priorities necessary today for achieving this broad vision in the future.

Turning this SAP into action rests on more than just ideas and good intentions. It requires WPB residents, businesses, the City government, and other institutions to urgently rise to the challenge of making big changes – changes in our infrastructure, technological advances, ramped up green workforce development, and change in the decisions we make every day as members of the WPB community. The real work of implementation will come with the creativity, commitment, and participation of the entire community. Everyone must play a role.

2005

- Legislature passed the Florida Energy Act creating:
 - » The Florida Energy Comm. (FEC)
 - » Energy grants
 - » Solar rebate program

2007

- Governor Charlie Crist signed executive orders aimed at:
 - » Reducing greenhouse gases
 - » Establishing an Action Team on Energy and Climate Change
- Legislation passed directing Florida Building Commission to create a model green building ordinance

- Legislation passed directing local governments to include GHG reduction strategies into the Local Government Comprehensive Plans
- Legislation passed requiring municipal governments and state agencies to construct new buildings to a recognized green third party rating system
- Legislation passed requiring the Florida Building Code to become significantly more energy efficient

2005 ▶▶▶▶

2006 ▶▶▶▶

2007 ▶▶▶▶

2008 ▶▶▶▶

- Mayor signs onto the US Conference of Mayors Climate Protection Agreement.

- Office of Sustainability established
- City Green Team created
- City received an Energy Efficiency Block Grant (EECBG) Award
- City Green Task Force created

City of West Palm Beach SUSTAINABILITY TIMELINE

2006

2008

2009

- Major bills passed providing authority to local governments to create energy financing and retrofitting programs
- State's recycling targets revised to become more aggressive
- Lake Pavilion: City's first LEED Silver Building Certification
- Green Families/Green Future Library Kits

2011

- Green Students/Green Future Teacher Kits

2009 ▶▶▶▶

- Public Utility Department initiated Asset Management planning Process:
- e4 Sustainability Summit 2009
- Go Green/Save Green Library Kits

2010 ▶▶▶▶

- June: City Green Task Force completed a recommendations document and as a result:
 - » Green Building Sub-Committee formed
 - » The Planning and Zoning Department worked with their Urban Agriculture and Committee Gardens Sub-Committee to increase local availability of fresh, nutritious foods within the city
- October: City passed Ordinance 4298-10 creating the Sustainability Advisory Committee
- e4 Sustainability Summit 2010

2011 ▶▶▶▶

- Installed 7 electric vehicle charging stations (2 provide free charging to the public)
- Introduced 5 Nissan Leafs into the City's fleet (100% electric)
- Contract executed for the City's first Guaranteed Energy Performance contract (\$6.8M cost with estimated \$11M savings over 15 years)
- Completed community WaterSIP project, installing 2,000 high efficiency showerheads, faucet aerators, and 230 commercial pre-rinse spray valves
- 2011 e4 Sustainability Summit at the Waterfront

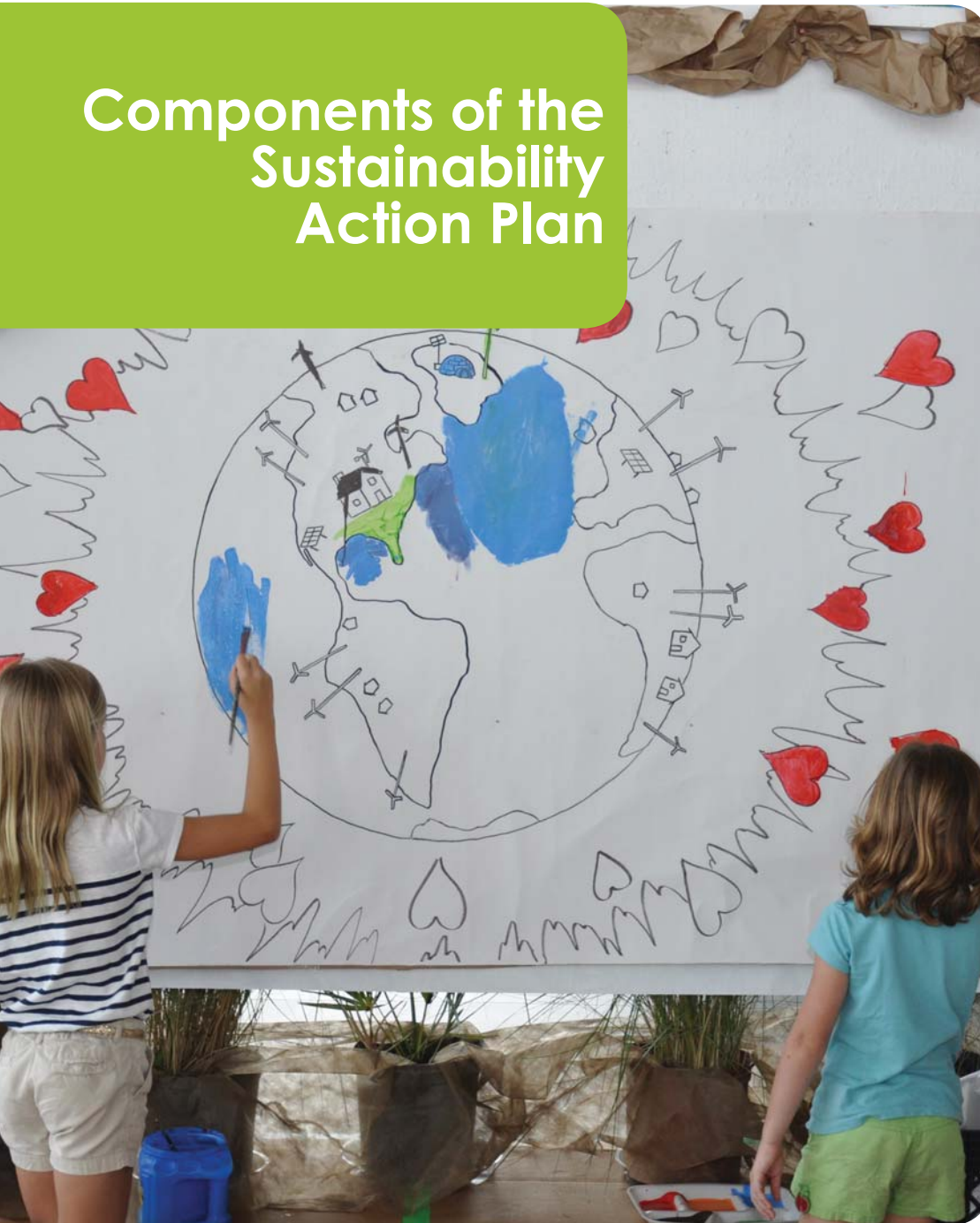
2012 ▶▶▶▶

- 2012 e4 Sustainability Summit at the Waterfront
- Adopt the City's Sustainability Action Plan
- High Efficiency Toilet voucher program (min. 500, \$100 vouchers)
- Completed FPL donation for 25kW solar array installed on the Waterfront trellises
- EECBG Grant completed

2010

2012

Components of the Sustainability Action Plan



Components of the Sustainability Action Plan

The SAP is focused on the greatest reductions of GHGs based upon collected data, incorporating the community's priorities, setting measurable targets for reductions of GHGs and/or energy use, having specific actions, projects and programs to achieve the targets for the SAP and, finally, defining and creating a mechanism to measure success. The key components of the SAP are:

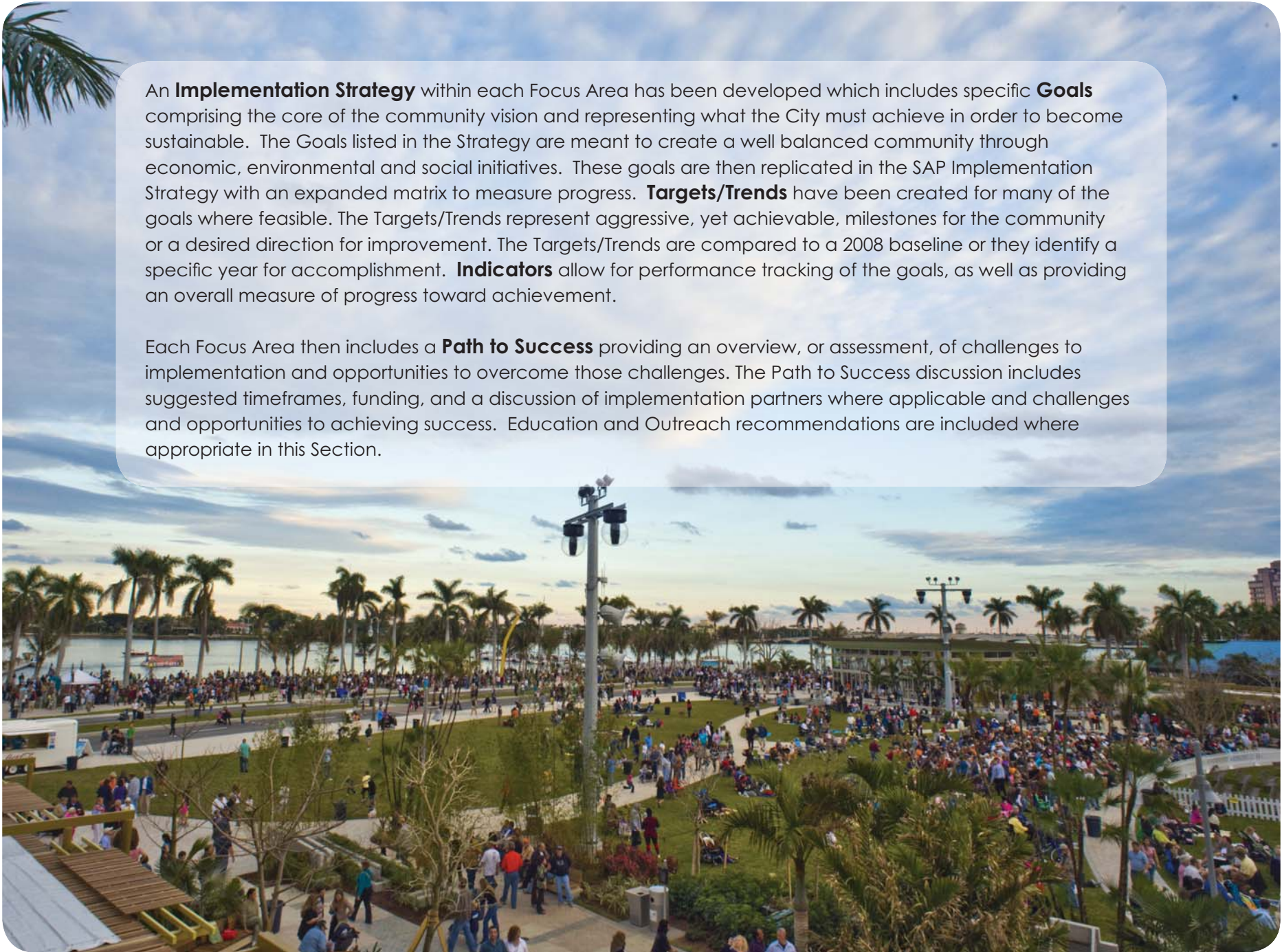
- Defining the sources of GHG emissions and how those emissions are used to set reduction goals.
- Develop focus areas to cover all aspects of community and City operational sustainability.
- Establish a Timeline for the Plan's implementation.
- Setting measurable actions; ensure transparent tracking and report progress toward our goals, including funding.

The overall structure of the SAP stems from a piece of legislation at the federal level used to establish Goals, Targets, Indicators and Actions to measure success of the SAP:

Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," was signed by President Obama on October 5, 2009 with a goal "to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions (GHG) a priority for Federal agencies." The Executive Order requires Federal agencies to set a 2020 greenhouse gas emissions reduction target; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support sustainable communities; and leverage Federal purchasing.

An **Implementation Strategy** within each Focus Area has been developed which includes specific **Goals** comprising the core of the community vision and representing what the City must achieve in order to become sustainable. The Goals listed in the Strategy are meant to create a well balanced community through economic, environmental and social initiatives. These goals are then replicated in the SAP Implementation Strategy with an expanded matrix to measure progress. **Targets/Trends** have been created for many of the goals where feasible. The Targets/Trends represent aggressive, yet achievable, milestones for the community or a desired direction for improvement. The Targets/Trends are compared to a 2008 baseline or they identify a specific year for accomplishment. **Indicators** allow for performance tracking of the goals, as well as providing an overall measure of progress toward achievement.

Each Focus Area then includes a **Path to Success** providing an overview, or assessment, of challenges to implementation and opportunities to overcome those challenges. The Path to Success discussion includes suggested timeframes, funding, and a discussion of implementation partners where applicable and challenges and opportunities to achieving success. Education and Outreach recommendations are included where appropriate in this Section.



Focus Areas.

The Focus Areas established for the SAP are based upon stakeholder involvement at the inaugural e4 Sustainability Summit held in 2009 and the two (2) years of work from the City Green Task Force. To assure that the SAP promoted the concept of meeting multiple objectives, and to assure that the SAP addressed the business community's concerns, a new Focus Area, "Growing a Green Economy" was developed and the Team consulted with the Downtown Development Authority, Community Redevelopment Agency and Chamber of Commerce of the Palm Beaches.



1 Natural Resources & Water Conservation

- NR 1.0 Improve and implement stronger water conservation measures.
- NR 2.0 Differentiate urban ecosystem as an appreciation asset that supports sustainable development.
- NR 3.0 Maximize protection of Grassy Water Preserve and determine the carbon offset value of the City's natural assets in achieving its GHG Target.
- NR 4.0 Encourage green infrastructure approaches at the site, community, and regional scales to increase resilience to natural hazards (including climate change impacts) and better manage stormwater runoff.
- NR 5.0 Increase multiple uses of open space by maximizing resource efficiency of parks and public property.
- NR 6.0 Reduce use of chemicals entering natural areas and water supply.

2 Energy Efficiency & Renewable Energy

- ER 1.0 Diversify energy sources and build the energy economy.
- ER 2.0 Promote a "cultural shift" to save money and reduce carbon emissions.
- ER 3.0 Develop "Best Practices" tool kit.
- ER 4.0 Highlight available and pending incentives for energy retrofitting and renewable energy deployment.

3 Land Use, Redevelopment & Transportation

- LU 1.0 Make cycling, walking, public transit, and other sustainable mobility modes the mainstream.
- LU 2.0 Encourage and incentivize land uses and density to facilitate development and redevelopment opportunities linked to transit.
- LU 3.0 Accelerate implementation of the City's Bicycle and Pedestrian Plans and continue efforts to make walking and cycling safe, healthy, and enjoyable alternatives to driving.
- LU 4.0 Manage parking effectively to minimize driving demand and encourage and support alternatives to driving.
- LU 5.0 Create incentives for low-carbon vehicles such as electric vehicles and plug-in hybrids and make transit infrastructure energy efficient.
- LU 6.0 Create sustainable design standards for transportation projects and systems.

4 Sustainable Buildings & Housing

- SB 1.0 Encourage innovative strategies that minimize energy and water consumption, maximize the recycling of construction debris, and make for a more comfortable indoor environment.
- SB 2.0 Integrate housing and redevelopment programs to achieve common goals.
- SB 3.0 Realize cost-effective, wholebuilding solutions that reuse buildings, keep the historic fabric of buildings and structures intact and improve the energy performance of the building.
- SB 4.0 Simplify project review and permit approval process to encourage innovative green building measures.
- SB 5.0 Provide meaningful incentives to encourage green and energy efficient building practices.
- SB 6.0 Promote the use of non toxic and healthy building products for new construction and renovations.

5 Waste Management & Recycling

- WM 1.0 Enhance recycling, composting, and source reduction services for residential and non-residential buildings.
- WM 2.0 Create C&D recycling program that results in high levels of reused materials.
- WM 3.0 Make recycling and composting mandatory at public events and provide more public recycling containers.

6 Growing a Green Economy

- GE 1.0 Form a green jobs /economic development program to create new opportunities for clean energy tech trades.
- GE 2.0 Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups.
- GE 3.0 Develop incentives to attract green businesses and create green jobs.

7 Urban Agriculture & Community Gardens

- UA 1.0 Provide community gardens in interested neighborhoods.
- UA 2.0 Complete a food-system assessment and specific plan to promote urban agriculture and community gardens with goals and targets.
- UA 3.0 Create a partnership with not-for-profits, for-profits, business associations and others to develop incentives that work to encourage urban farms and agricultural opportunities.

Implementation Strategies by Focus Area and for the Overall SAP.

While measuring GHG emissions, establishing reduction targets, and developing a SAP are essential steps, but the most important component of the SAP effort lies ahead: Implementation. The Goals, Targets/Trends and Indicators (and Path to Success) in the individual Focus Areas will help shape the SAP Implementation Strategy.

Appendix A includes a consolidated list of the Goals, Targets/Trends and Indicators but expands that list into the overall SAP Implementation Strategy, which includes actions and timeframes.

Actions are then identified to reach the Target/Goals. The identification of a Timeframe was based on the ease with which the Goal or Target could be implemented based on such factors as whether or not it was a new initiative, whether or not there was a clear responsible Department or party to implement it, whether or not there was a related case study that could expedite its implementation and whether or not funding was a challenge. The SAP Implementation Strategy will be finalized within six (6) months of adoption of the SAP to assure adequate City Staff and Stakeholder input.

For some Indicators, no specific numerical Targets have been assigned yet. With the development of the GHG inventory, it

becomes evident that the data and analysis to support certain Focus Areas, such as Energy Efficiency and Renewable Energy, would have a more measurable direct impact on reducing GHG emissions. An example would be to reduce the City's energy use by a certain percentage based on a forecast year or reduce the City's fleet fuel usage by a certain percentage. Other Indicators and Targets may not lend themselves to specific GHG reduction levels because they are not necessarily quantifiable at all. But, the Office of Sustainability will select relevant, easily understood, and reliable metrics with which to communicate the progress towards realizing the Goals as appropriate.

To become a part of the City's long term vision, the SAP Implementation Strategy will be integrated into the Comprehensive Plan and will also function as a standalone document. It will expand upon, and complement, the Goals, Objectives and Policies contained in the Comprehensive Plan, in some cases highlighting certain elements, while filling the void in other areas. Portions of the SAP Implementation Strategy may also lend themselves to Code revisions and suggestions are made on where this might be appropriate. While the 2011 legislative session brought considerably more flexibility to a local government's Comprehensive Plan, energy and climate change adaptation, issues are still addressed on some level.^{vi}

GOAL	TARGET/TREND	INDICATOR
<ul style="list-style-type: none"> CF 1.0 Optimize the management, planning & maintenance of assets to reduce GHG emissions in City Operations and Facilities. 	<ul style="list-style-type: none"> Achieve a 19% reduction in GHG emissions by 2018, a 32% reduction in GHG emissions by 2025 and a 37% reduction in GHG emissions by 2035. 	<ul style="list-style-type: none"> Electricity use in City Facilities and Operations. GHG emissions in City Facilities and Operations. In the long term, when the EMS is developed, % of processes, programs and sites covered in utilities.

Table 1. Sample Implementation Strategy

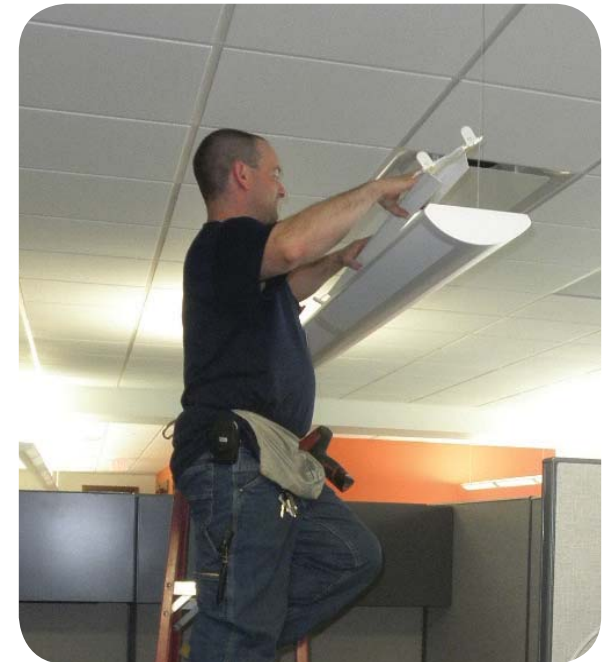


Source: Navarro Lowery Ecoplex

Implementation and Reporting.

Several of the recommendations in the SAP require Commission approval separate from adoption of the SAP and also require additional funding in order to be implemented. Implementation priorities will be reviewed annually by the City Commission as part of the capital improvements planning process. Additionally, the SAP Implementation Strategy includes a consolidated list of the Goals, Targets/Trends and Indicators but expands that list into the overall SAP Implementation Strategy. The SAP Implementation Strategy will be finalized within six (6) months of adoption of the SAP to assure adequate City Staff and Stakeholder input which will focus on:

1. Establishing an implementation timeline for actions included in the SAP
2. Continue to identify funding opportunities and develop sustained revenue streams to support climate protection initiatives
3. Establish a stakeholder "infrastructure" that facilitates the efficient distribution of information to multiple community stakeholders and also enables community members to effectively report climate protection actions.





Progress toward GHG Emissions Goals.

City staff has made its best effort to make determinations regarding the strategies proposed in this SAP based on the state of current information, but these estimates will need to be refined over time. Given the range of assumptions that can be made when evaluating the impact of a given strategy, it is often difficult to estimate with precision the GHG reductions that will occur upon implementation of the actions in this SAP. Progress toward goals will be based on a template on the following page showing the hierarchy between goals, targets/trends, indicators and actions. This data will be drawn from the tables in Appendix A which can be circulated to City staff for periodic updates to be incorporated into the annual capital planning process. Quantifying the benefits of GHG emissions reductions is an evolving area of work in these initiatives but should be incorporated into the annual update process for the SAP as described below. A good model for translating and quantifying emissions reductions strategies can be found in the California Air Pollution Control Officers Association ("CAPCOA") new guide "Quantifying Greenhouse Gas Mitigation Measures".

Timeframe for Implementation.

The SAP reflects the City's current implementation priorities. It does so by including an "implementation timeframe" for every implementing action included in the plan. The implementation timeframe designates each action for short, medium or long-term implementation based on whether or not the action requires new funding, integration with an existing initiative or creation of a new program. Red, yellow and green designations indicate whether or not the action item is on time.

Process for Monitoring and Annual Reports.

Because of the difficulty associated with modeling potential emissions reductions with precision, it is especially important to monitor and report actual reductions over time, as well as other indicators, as part of the implementation process. A number of tools and practices exist that can enable the City and its community partners to track and report progress toward achieving the goals outlined in this plan. The City will track City Facilities and Operations aggregate emissions by conducting GHG emissions inventories at least every three (3) years or more frequently if conditions warrant.



To Motivate people to act, the City must:

Lead by example and report on successes of City's efforts. Unify City departments and policies through clear leadership by the Mayor, City Commission and City Administration.

Relate to people in terms they can understand: doing the right thing and saving money.

For each goal outlined in the SAP, the City is working to define, monitor and report on measurable indicators that assist the community in determining to what extent a given goal is being achieved. Establishing, monitoring, and reporting on indicators that enable the community to gauge progress toward the goals outlined in the SAP and to continuously evaluate implementation priorities is critical to success. This will include regular, transparent reporting on community progress toward achieving the goals outlined in this plan and serves to:

- Increase accountability for implementing agencies, including the City government;
- Assist the City and its partners to evaluate the effectiveness of the policies and actions associated with each goal; and
- Enable the City and the community as a whole to continuously evaluate implementation priorities and revise and build upon them as necessary.

On an annual basis, the Sustainability Advisory Committee will receive a Progress Report from the Office of Sustainability illustrating progress on Goals, Indicators and Targets/Trends. The Progress

Report will be used to create the Annual Report Card (sample included as Appendix B), for wider distribution within the City and the surrounding community. It is the intent of the Annual Report Card to share successes and challenges with the overall community. Sharing information and networking with the larger community are absolutely critical for the success of our efforts. The Annual Report Card will also provide an opportunity to receive guidance on implementation priorities, resource allocation; to present updates on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization; and to report progress made on specific indicators and metrics to be used for tracking the implementation of actions in the plan, including:

- Estimated GHG reductions
- Implementation Status
- Progress towards Targets
- Barriers or changes in strategy

The City will also maintain a web-based portal that enables the City to effectively and transparently communicate the goals outlined in the SAP and progress toward achieving those goals.

Costs and Benefits of Emissions Reductions.

The emission of GHGs and their associated impact on global climate change presents policymakers with extensive technical, economic and policy challenges. Different GHG reduction measures have different costs. Some measures are economical; the adoption of such a measure should occur regardless of its GHG reduction benefits. Energy efficiency measures generally fall into this category because the energy savings are sufficient to more than pay for the cost of the measure. Any additional direct benefits, such as a reduction of GHG, would only make that measure even more cost-effective.

Other measures have costs that exceed the narrowly defined economic benefits before their impact on GHG emissions and other co-benefits are accounted for. For instance, reduced emissions should translate into lower increases in global temperatures and should therefore lower the net economic and other costs associated with global climate change. Other benefits may also occur that are not related to global climate changes, such as reductions in other air emissions or improved flood control.

In some cases, the GHG reduction benefits and the non-GHG reduction benefits can be quantified, although the range of uncertainty around specific point estimates may be large. In other cases, it is not practical to provide any reasonable quantification of these two (2) categories of benefits; nonetheless these unquantifiable benefits are real and should be considered as demonstrated in Figure 2.^{vii}

Category	BENEFIT	BENEFIT TYPE	QUANTIFIED/UNQUANTIFIED
All Categories	CO ₂ Reductions	Direct	Quantified
	Sea Level Rise Abatement	Co-Benefit	Unquantified
	Job Creation	Co-Benefit	Unquantified
Green Buildings	Electricity Reduction	Direct & Co-Benefit	Quantified
	Natural Gas Reduction	Direct & Co-Benefit	Quantified
	Reduced SO ₂ & NO _x	Co-Benefit	Quantified
Waste Management	Electricity Reduction	Direct & Co-Benefit	Quantified
	Reduced SO ₂ & NO _x	Co-Benefit	Quantified
	Enhancement of Aesthetic & Property Values	Co-Benefit	Unquantified
Warming gases from C&I Refrigeration & A/C	Indoor Air Quality	Co-Benefit	Unquantified
Terrestrial Sequestration of Carbon	Reduction of Urban Heat Island Effect	Co-Benefit	Unquantified
	Stormwater Control	Co-Benefit	Unquantified
	Wildlife Protection	Co-Benefit	Unquantified
	Water Quality Protection	Co-Benefit	Unquantified
Transportation and Land Use	Gasoline Use Reduction	Direct & Co-Benefit	Quantified
	Renewable Energy Use	Direct & Co-Benefit	Quantified
	Reduced Dependence on Foreign Oil	Co-Benefit	Unquantified
	Improved Road Conditions	Co-Benefit	Unquantified
Electricity Generating Units	Reduced SO ₂ & NO _x	Co-Benefit	Quantified

Figure 2: Quantifying GHG Strategies

Source: Center for Energy, Economics & Environmental Policy, Rutgers University



Florida recently completed a statewide study of the impacts of the Florida Energy and Climate Change Action Plan on the State's economy. The Florida Energy and Climate Change Action Plan designs policies and measures to mitigate the emissions of GHG. The report highlights 28 mitigation and sequestration strategies including energy supply and demand (Renewable Portfolio Standards, nuclear power and combined heat and power), transportation and land use (low GHG fuels and improving transportation system management), and agriculture, forestry and waste (forest retention and forest management for carbon sequestration). Most of the strategies discussed in the paper had positive macroeconomic impacts. Overall, the strategies are expected to increase the Gross State Product by about \$33 billion (0.66%). The study also estimates that about 129,000 full time equivalent jobs (direct and indirect) will result from the mitigation strategies. This represents an increase of nearly one percent over baseline projections.^{viii}



Considerations for Developing Education and Outreach Strategies to Accomplish Actions.

The success of the SAP is dependent upon the participation of all residents, businesses, and institutions within the City. Sustainability should not be an abstract term used only by government, scientists and environmentalists; it should be a way of life in which informed aware citizens become environmental stewards and work together to make WPB a better city. In order to reach all members of our community, information needs to be made readily available in many different formats and in many different locations. Methods of promoting awareness will range from passive information (sustainability calendars, website) to active involvement (neighborhood challenges) and targeted education provided by membership organizations. A key aspect is building collaborative relationships with the City's numerous homeowner and neighborhood associations.



Because Education and Outreach is the central way to call people to action and effectuate positive change in the community, recommendations are made in each Focus Area where they are relevant rather than as a separate stand alone Section. There were some consistent themes which were identified during the SAP Workshop, Stakeholder Interviews and other Public Outreach activities, and rather than repeat them in each individual Focus Area Sections, those are discussed generally here. In particular, the input received highlighted that cultivating a sense of environmental ownership and responsibility in youth ensures that WPB's sustainability efforts will continue into the future. Generally, the messages that became apparent were:

- Maintaining a presence at community events.
- Highlight community successes including business sector.
- Cut across age groups, geography and ethnicities. Reach the diverse constituencies of WPB who receive



information from a wide variety of outlets. By sharing informational resources with churches, recreational facilities, and other community centers, more people will have access to the knowledge and tools they need to think and live sustainably.

- Engage the community in competitions and challenges to educate and motivate changes in behavior while having fun. Potential audiences include neighborhoods, schools, local businesses and City agencies.
- Highlight sustainable initiatives through use of City's website and television station. Highlight a specific area (e.g. energy efficiency, recycling, tree planting and care) each month of the year in order to concentrate messages and engage the entire WPB community cohesively around specific goals.
- Develop a youth-designed programming where young people can share their ideas with each other, find information on actions they can

- take to improve the environment, and connect with sustainability-oriented groups already active in the City. Convene an event for young people and some adult leaders of youth development organizations to describe the SAP. Use the forum to gain advice and guidance on how to meaningfully engage young people in the process.
- Recruit, train, and deploy a cadre of volunteer "Sustainability Ambassadors" to educate residents and businesses about environmental stewardship using a peer to peer model.
 - Partner with restaurant associations on recycling, boating clubs on water quality, preservation and architecture groups on sustainable design, and real estate managers on energy efficiency.
 - Develop long term strategic partnerships with institutions of higher learning to assist in the implementation and update of the SAP.

Ride Green
 ~ Valet your bike
 ~ Arrive by alternative transportation and receive FREE items!
 ~ Cycling activities for all ages
 ~ 100% BODIES - LEARN LOVE CYCLING AND EARTH SMART COMMUNITY

Green Exhibitors
 ~ See what's GREEN in West Palm Beach!

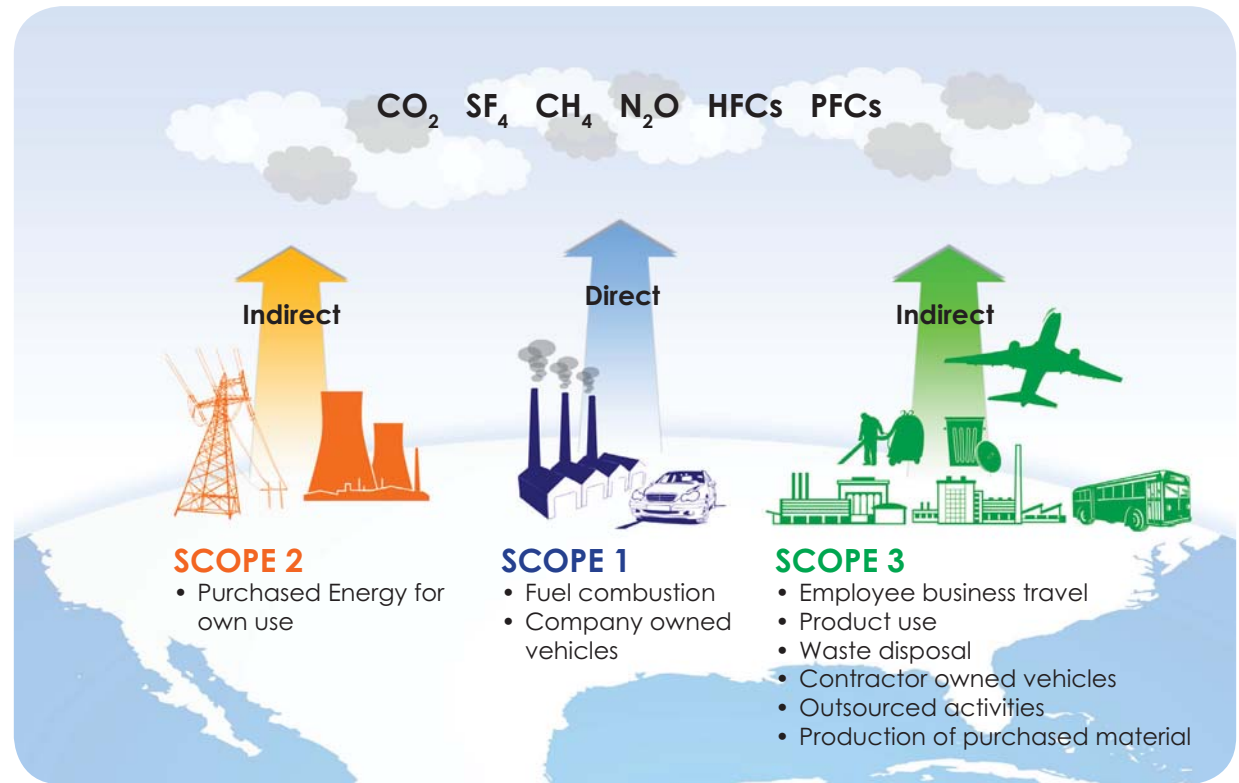
GREEN AUTO DISPLAYS

- FISKER KARMA
- NISSAN LEAF
- CHEVY VOLT
- PALM TRAN HYBRID BUS

GARBAGE GONE Glam
 Raising awareness through fashion!
 2.25.2012
 12:00-1:00pm

wpb.org/e4
 561.804.4994

Benchmarking the City and Community's Current Greenhouse Gas Emissions



Source: WRI/WBCSD GHG Protocol Corporate Standard, Chapter 4 (2004) (adapted)

Creating a Greenhouse Gas Inventory.

In order to develop the necessary goals, targets, and actions of the Plan we need to understand where to begin, we must first establish what is known as a baseline or benchmark. Benchmarking the City's GHG emissions provides a starting point to develop emissions reduction goals and forecasting models. The GHG Inventory was completed for both City Facilities and Operations as well as the entire community of WPB.

Discussion of Data, approach and methodology.

This inventory measures total energy consumption and GHG emissions from municipal buildings and operations as well as from the community at large and serves as a baseline from which energy reduction and other sustainability strategies can be measured.² The City selected calendar

2. Greenhouse gases measured include CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, all displayed in carbon dioxide equivalents (CO_{2e})



year 2008 as the baseline year and all progress is measured from that point forward. To ensure that WPB stays on course to meet this long-term target, it makes sense to set interim, short-term targets and to track emissions reduction progress over time by conducting regular, community-wide greenhouse gas emissions inventories.

The Greenhouse Gas Inventory is compliant with the Local Government Operations Protocol (LGOP): For the quantification and reporting of greenhouse gas emissions inventories (Version 1.1, Released in May 2010). The Local Government Operations Protocol (LGOP) was developed in partnership with and adopted by the California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and the Climate Registry. While no such protocol exists at this time for the development of a Community Scale Greenhouse Gas Inventory, there are a number of industry best practices that were utilized in the development of the Community Inventory and many calculations from the Local Government Operations Protocol (“LGOP”) were applied to the community-scale data. GHGs are often reported in terms of their “Scope.” In fact, to be compliant with the LGOP, it is required to report emissions by scope.^{ix} This method of reporting provides a clear and internationally recognized accounting and reporting framework while generating consistency among the many local governments and other entities reporting their GHG emissions. Emissions generally fall into three (3) scopes:

- Scope 1 – Direct Emissions,



- Scope 2 – Indirect Emissions (purchased electricity), and
- Scope 3 – Indirect Emissions (from other sources such as employee commute, waste disposal, etc.).

Reporting of Scope 3 emissions is optional, but the City chose to inventory and report Scope 3 emissions from solid waste and employee commute. It is important to note in reviewing the emissions breakdown that emissions can only be aggregated within scopes, not across multiple scopes. For example, the municipal consumption of electricity is the source of Scope 2 emissions for WPB, but would be a Scope 1 source for the power plant producing the electricity. Emissions within scopes should be accounted for separately. Generally, the Scopes are depicted in Table 2.

City Facilities and Operations GHG Inventory.

WPB's municipal operations were responsible for the emission of 83,189 metric tons of carbon dioxide equivalent (“MTCO_{2e}”) in 2008. This is equivalent to the annual emissions created by providing energy to approximately 7,068 homes. The breakdown of emissions by sector is listed in Table 3. Wastewater treatment (including both process emissions and facility energy-related emissions) is responsible for the greatest portion (33%) of GHG emissions. Process emissions produced through wastewater treatment are those GHG's released during the breakdown of organic materials. All other buildings are responsible for a significant portion (21%) as well, indicating the importance of incorporating energy efficiency strategies into buildings in the

City's overall sustainability planning. This is particularly true for the City's wastewater treatment facility given the high amount of energy required in its operation. Emissions sources for this inventory include purchased electricity and consumption of natural gas to operate buildings, outdoor lighting, and other facilities. The Buildings and other Facilities sector includes electricity consumption from water delivery and wastewater facilities. Also included are emissions from combustion of vehicle fuel in the City's vehicle fleet (as well as estimated emissions from vehicles used in employees' commute), fugitive emissions from refrigerants used in vehicles, process emissions from wastewater treatment, and that portion of landfill emissions and emissions from the combustion of municipal solid waste (including both anthropogenic and biogenic sources³) attributable to the solid waste generated by the municipal operations of WPB. These solid waste emissions are the second largest portion (26%) of the City's GHG emissions. Strategies to reduce waste generation within City operations would have a significant impact in reducing this portion of its overall emissions.

3. Anthropogenic sources in municipal solid waste include materials such as plastics, rubber, and other man-made and fossil-fuel derived sources. Biogenic sources include yard trimmings, food waste (that has not been composted), wood, textiles, etc. The portion of MSW that is biogenic is often considered a "renewable" energy resource because biogenic waste is a recurring stream and part of an existing ecological cycle. It also replaces the need to create energy through the extraction and combustion of fossil fuels. The biogenic portion is equal to 73% of total emissions from MSW incineration in WPB.

Local Government Emissions by Scope and Source			
	SECTOR	SOURCE	CY 2008 CO _{2e} (metric tons)
SCOPE 1	Buildings & Other Facilities	Non-electric energy consumption	150
	Water Delivery Facilities	Non-electric energy consumption	-
	Wastewater Facilities	Non-electric energy consumption	-
		Process & fugitive emissions	1,991
	Vehicle Fleet	Mobile combustion of fuel	7,851
		Fugitive emissions	57
	Other Process & Fugitive Emissions	Refrigerants and fire suppression equipment	N/A
		Total	10,050
SCOPE 2	Buildings & Other Facilities	Purchased Electricity	7,638
	Water Delivery Facilities	Purchased Electricity	9,561
	Wastewater Facilities	Purchased Electricity	25,483
	Streetlights & Outdoor Lighting	Purchased Electricity	3,797
			Total
Scope 3	Solid Waste	Emissions from combustion of municipal solid waste ("MSW")	19,978
		Methane from government-generated waste	1,589
	Employee Commute	Mobile combustion of vehicle fuel	5,093
			Total
		Grand Total	83,189

Table 2. WPB Emissions by Scope

Solid waste is addressed as a source of Scope 3 emissions for the government of WPB. The total emissions of Palm Beach County Solid Waste Authority's ("SWA's") Class I and Class III landfills are reported in the community inventory, but the waste

that is directly attributable to the local government's operations was isolated and included in the government inventory. The SWA provided data on the landfill's annual collection and a financial breakdown of each community's tipping fee in their

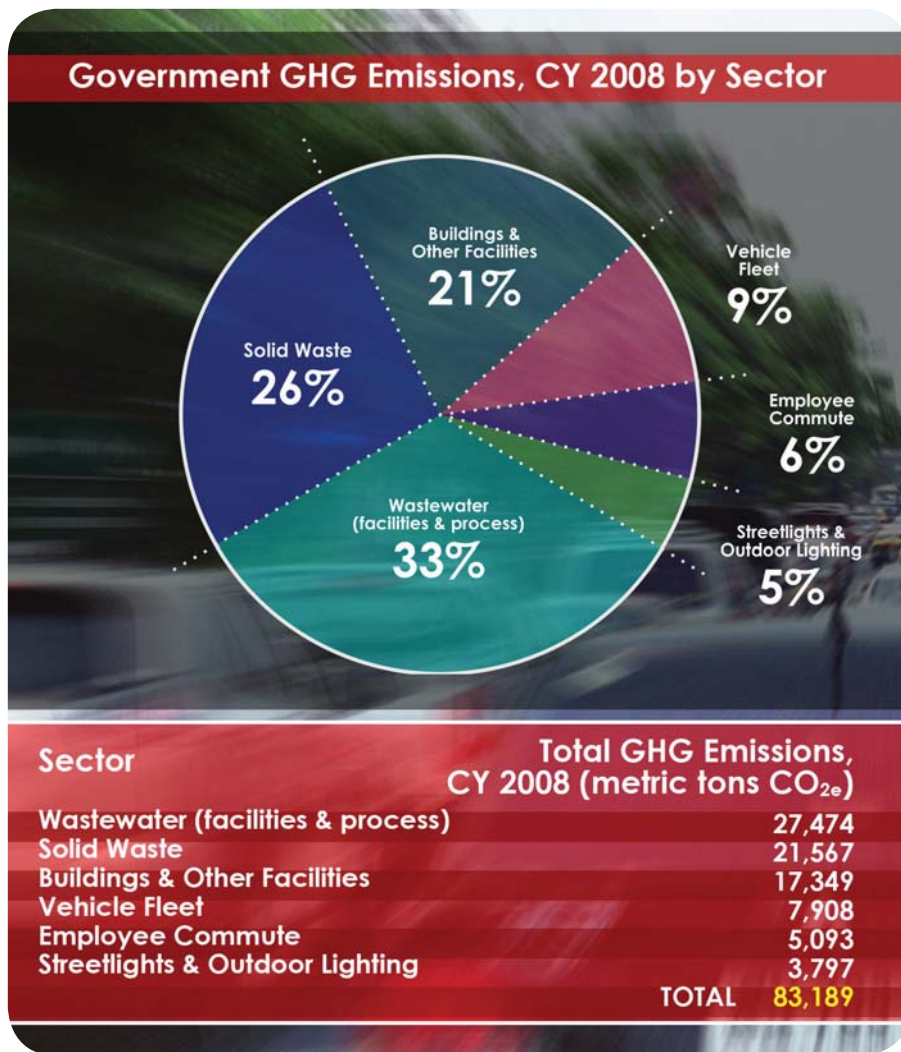


Table 3. Total MTCO_{2e} by Sector (City Facilities and Operations)

Comprehensive Annual Financial Report FY08 and FY09 (page 55), which showed that the City was responsible for 8.6% of tipping revenues. The City Sanitation Department provided documentation from Accounts Payable for 2009 and 2010; data for 2008 was not available. It was assumed that the source of solid waste within the City did not change dramatically between 2008 and 2009/2010.

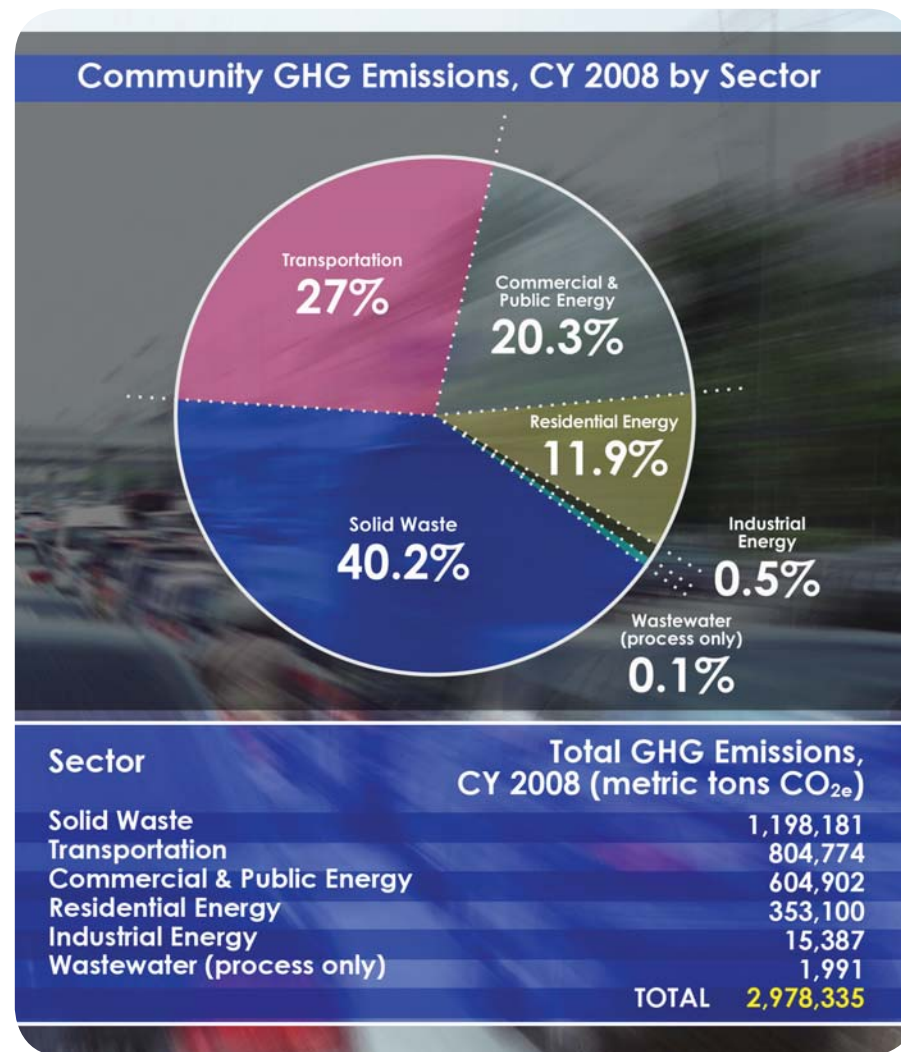


Table 4. Total MTCO_{2e} by Sector (Communitywide)

This information showed that the City's Sanitation Department was responsible for 21% of the City's total tipping fee payments. From this, it could be determined that the City government of WPB was responsible for 1.8% of the total waste deposited in the landfill in 2008. Once the total emissions from the landfill were calculated (see Communitywide GHG Inventory), the total was multiplied by

0.018 to find the emissions generated by the local government's solid waste. This same percentage methodology was applied to the emissions from municipal solid waste incineration at the SWA's waste to energy facility

Communitywide GHG Inventory.

The community inventory includes emissions generated by all residences and businesses within the City, including government operations. The sources of these emissions are from electricity, natural gas, and fuel oil used in buildings, fuel from the transportation sector (based on vehicle miles traveled), emissions from the SWA's existing Waste to Energy facility and from its Class I and III landfills located within the City limits, and process emissions from treatment of wastewater.⁴ The total community-wide emissions from the City in 2008 were 2,978,337 MTCO_{2e}. This is equivalent to the annual emissions from providing energy to more than 253,809 homes. The breakdown of emissions by sector is provided in Table 4. The solid waste sector was responsible for the largest share of emissions (40%). This is not surprising given that emissions from this sector include methane emissions (with a global

4. Because the City operates the wastewater treatment facility, all process emissions associated with wastewater treatment were included in both the government and community inventory although the facility is owned by five (5) local governments including Palm Beach County.

warming potential 21 times that of carbon dioxide) from the decomposition of solid waste in the landfills⁵ as well as emissions from the incineration of MSW at the existing Waste to Energy Facility. It is worth noting that municipal solid waste includes both anthropogenic and biogenic sources. While incineration of ALL solid waste produces emissions, biogenic emissions are sometimes considered a "renewable" energy resource because it is part of an existing ecological cycle.

SWA landfills are required to have Environmental Protection Agency Subpart WWW compliant landfill gas management systems. The Class III landfill gas is collected and flared. The Class I landfill gas is collected, stripped of water, and sent to the Biosolids Pelletizer as fuel. There is also a flare at the Class I landfill to serve as the control device when the pelletizer is not running. Both systems for collection and management are designed to comply with the U.S. Environmental Protection Agency ("EPA") regulations in Subpart WWW, and compliance testing and reporting is done to Florida Department of Environmental Protection ("DEP"). Both landfills are classified as comprehensive collection

5. It should be noted that the landfills do have methane capture technology in place and are capturing 75% of methane emissions at those sites. This capture rate has been taken into account when calculating emissions from this sector.

systems according to Chapter 9 of the LGOP. Since the two (2) landfills have comprehensive collection systems, Equation 9.1 was used to calculate the CH₄ emissions from SWA's two (2) landfills. The amount of landfill gas recovered from each landfill was provided by the SWA and the remaining factors necessary to calculate the emissions were the default factors provided by the LGOP.



The solid waste sector was responsible for the largest share of emissions (40%). This is not surprising given that emissions from this sector include methane emissions (with a global warming potential 21 times that of carbon dioxide)

Forecasting of Emissions and Setting Reduction Targets.

City Facilities and Operations GHG Targets.

With the completion of the baseline GHG Inventory, the City is also able to forecast the growth of emissions for municipal operations under various scenarios. Because the City can control its municipal operations, the forecast scenarios and target development are based only on municipal (not communitywide) GHG emissions. Other Goals, Targets/Trends and Indicators for the Focus Areas have been developed as data is available and as those Targets and Indicators are quantifiable. For consistency and comparability purposes, the emissions forecasting analysis was completed using similar scenarios and methods as those analyses completed for the cities of Boynton Beach and Lake Worth. The forecast includes three (3) scenarios with three (3) target years: 2018, 2025, and 2035.

- Scenario 1: Business as Usual (“BAU”)
- Scenario 2: West Palm Beach Comprehensive Plan Solid Waste Reduction Target
- Scenario 3: State of Florida Executive Order 07-127

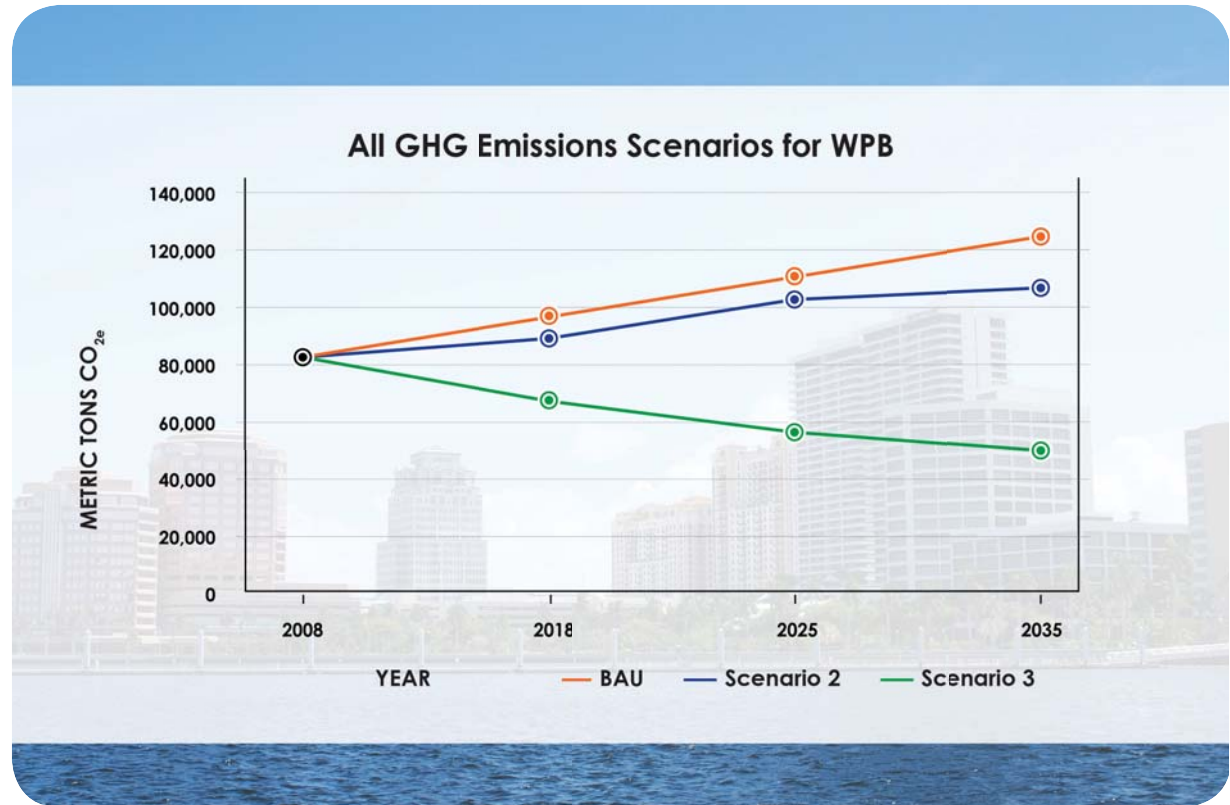


Figure 7: All GHG Forecast Scenarios and GHG Increase or Reductions

	2008 Baseline	2018 Emissions	%Change	2025 Emissions	%Change	2035 Emissions	%Change
Scenario 1: Business As Usual	83,189	96,870	16%	112,056	35%	122,239	47%
Scenario 2: Targeted Reduction	83,189	89,041	7%	102,869	24%	112,192	35%
Scenario 3: Exec. Order 07-127	83,189	67,447	-19%	56,535	-32%	52,012	-37%

Chart 7: Emissions forecast for target years

Scenario 1: Business as Usual.

This scenario estimates future emissions under Business as Usual BAU conditions, in other words, what the emissions will be if the City were to take no action to reduce them. It estimates a projected path of GHG emissions based on population projections, future electricity generation projections, and Florida's adoption of the California Motor Vehicle Standards (in February 2009).^x

Scenario 2: Solid Waste Reduction Target.

The City's current Comprehensive Plan states in Policy 1.2.1, that the City has a goal "to reduce solid waste going to landfills by 30 percent between 2008-2018" Scenario 2 adjusts the BAU projections for the solid waste sector only, by incorporating this 30% reduction in waste going to the landfill. It was assumed that the same waste reduction would apply to the MSW being incinerated since the actions for achieving the 30% reduction are focused on increased recycling efforts. It is important to note that there was not information available at the time the analysis was performed to estimate a specific and quantifiable impact and that the SWA will be opening a new Waste to Energy ("WTE") facility, expected to be fully operational in 2015. This second WTE facility is likely to significantly reduce landfill emissions (if not eliminate the need to keep the landfills open), but will increase emissions from municipal solid waste incineration.

Scenario 3: Executive Order 07-127.

The third scenario estimates emissions based on requirements under Governor Crist's 2007 Executive Order 07-127. This Order establishes statewide GHG reduction targets as follows:

- Reduce to 2000 levels by 2017;
- Reduce to 1990 levels by 2025;
- Reduce to 80% of 1990 levels by 2050

Chart 7 shows emissions for the forecast target years as well as the target years identified in the Executive Order. This scenario is important to the forecasting analysis because the reduction targets established in the Executive Order are consistent with targets being established in programmatic and policy activity at the federal level. It is, therefore, very likely that the State will face comparable mandatory reduction targets in the coming years and there will be pressure placed on local governments to assist the state in achieving those reductions.

Target Selection.

Because Scenario 3 is a likely reflection of what emissions reductions requirements will be in the future, it is recommended that this be adopted as the City's GHG reduction target for City Facilities and Operations. This target includes: a 19% reduction in GHG emissions by 2018, a 32% reduction in GHG emissions by 2025 and a 37% reduction in GHG emissions by 2035. Other "targets" will

be selected for GHG emissions sectors that lend themselves to a specific GHG reduction quantity. Not every goal will include a GHG reduction target though because not every goal will lend itself to that interpretation.

Data Management and Future Inventories.

Essential to the process of conducting any GHG inventory is laying the groundwork for tracking this data over time. Attached as an appendix to this report is a methodology document, which outlines the steps taken, assumptions made, and data used to calculate the baseline emissions. The City has also been provided with the necessary resources to track changes in overall GHG emissions and progress made in achieving the City's goals. These resources include:

- a list of emissions sources
- data needs and sources to calculate the emissions
- detailed data workbooks, calculations, and templates for future data collection and analysis.

To keep the City's GHG data current, the City will update the GHG inventory every three (3) years. If conditions warrant, such as a new source of emissions or a project comes online that could have a significant effect on the GHG and the City's priorities, the City may choose to re-inventory sooner than a three (3) year interval.

A nighttime photograph of a city waterfront. In the foreground, several tall palm trees are silhouetted against the dark sky. In the middle ground, a body of water reflects the lights from the city buildings and streetlights. In the background, several multi-story buildings are lit up, with their lights reflecting on the water. Two people are sitting on a bench in the lower right foreground, looking out at the water. The overall scene is a mix of natural and urban elements.

The City's GHG Reduction Target for City Facilities and Operations:

- **19% reduction in GHG emissions by 2018**
- **32% reduction in GHG emissions by 2025**
- **37% reduction in GHG emissions by 2035**

City Operations and Facilities



Overview.

The City owns and operates:

- Over 25 buildings, facilities and structures, varying in age with over 600,000 square feet of space.
- A water service area approximately 35,900 acres and including the Town of Palm Beach and South Palm Beach.
- A vehicle fleet including 930 cars, trucks, and service vehicles.

This infrastructure helps support the services necessary for approximately 100,000 residents and over 300,000 daily commuters. Although the City has a large inventory of existing buildings and facilities, new construction for buildings must be built to a sustainable building rating system or a national model green building code as prescribed by state law.

The City's water service area includes residents within the City's, and outside the City, limits. The City's service area is approximately 35,900 acres and includes the Town of Palm Beach and South Palm Beach. Primary withdrawals are made via a total of eight (8) surface water pumps located at two (2) pump stations on Clear Lake. In addition, the City is authorized to withdraw water from the ten (10) Surficial Aquifer System ("SAS") wells at the City's Wellfield. Withdrawals from the Wellfield are discharged to the M-Canal for treatment

City Government (Facilities and Operations) GHG Emissions are 83,189 MTCO_{2e} or 3% of the GHG emissions in the entire community



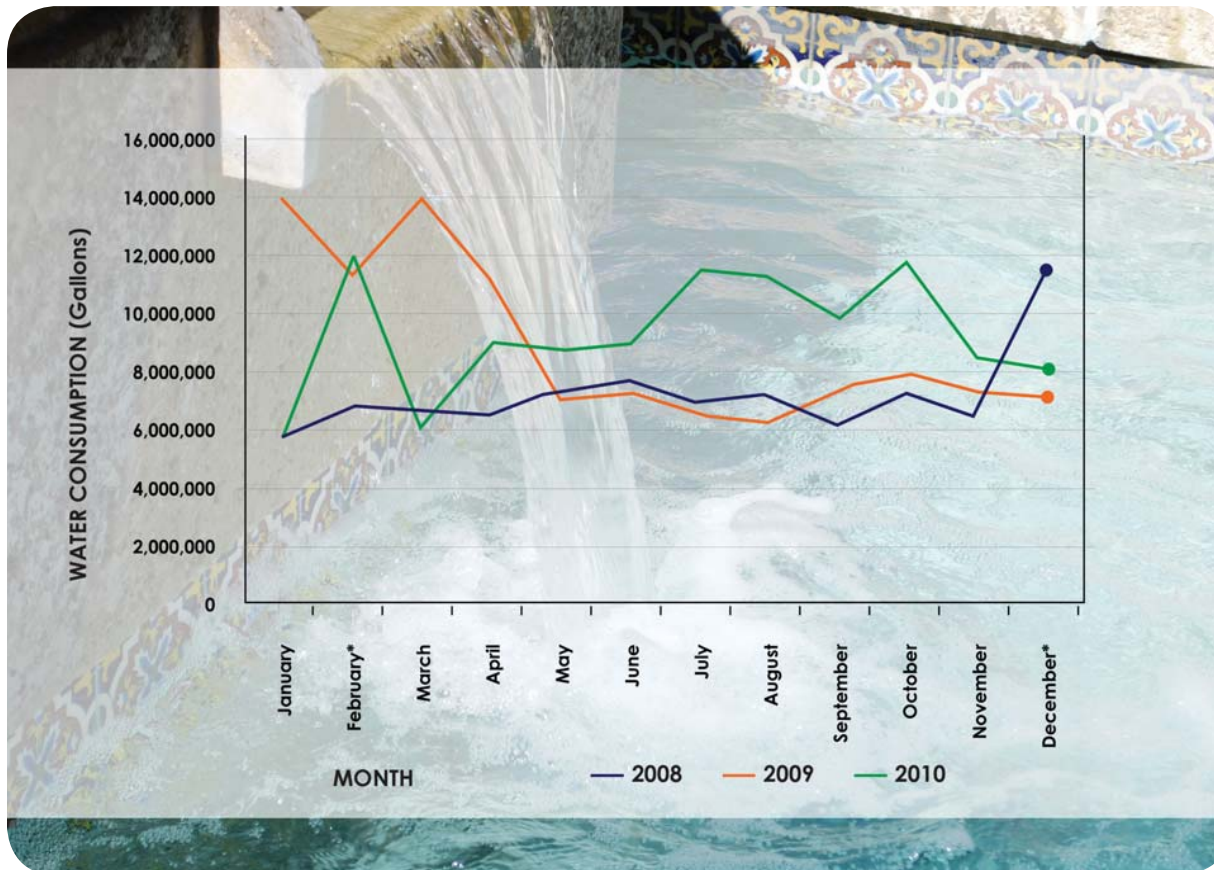


Figure 8: City Facilities and Operations Water Use by Month

at the Clear Lake Water Treatment Plant ("WTP") Energy management is a critical concern in water services due to rising cost, increasing energy demands of advanced water treatment technologies and the need to address GHG emissions. Because water distribution and treatment is energy intensive, the City will have to look for strategies to reduce new GHG emissions sources from these operations. For its operations, Figure 8 represents the City's water use by month.

The East Central Regional Water Reclamation Facility is funded and controlled by the City of Lake Worth, the City of West Palm Beach, the City of Riviera Beach, the Town of Palm Beach and Palm Beach County. The City of WPB owns 29.28571% of the capacity of the facility. The City of West Palm Beach is responsible for the operation of the facility. The ECRWRF is currently permitted to process 64 million

gallons of wastewater per day ("MGD"). Capacity of the facility will be increased to 70 MGD with the completion of an expansion project currently underway. The City has also initiated a Preliminary Engineering Report ("PER") that identifies design criteria of the unit processes, project flow and electrical power diagrams, basic process layout drawings, structural design criteria, ventilation criteria, acceptable materials and equipment lists for an anaerobic digestion facility, dewatering facilities and other related solids treatment and handling processes. Collectively, the ECR Board is contemplating the use of a two-phase anaerobic digestion process for the waste activated sludge to meet class B sludge requirements per USEPA Part 503 biosolids regulations. It is anticipated that the stabilized dewatered biosolids resulting from the Project will be further processed using heat drying technology for pelletizing at the Pelletizer operated by the SWA.

Encouraging full utilization of the energy products from the wastewater treatment process, such as biosolids and methane gases can mitigate some of the impacts from process energy use. The decomposition of the sludge generated in the treatment of wastewater causes significant contributions of methane to the atmosphere. Sludge can be shipped off-site to a landfill or treated on-site by composting, incineration or digestion. Methane emissions generated in these processes are normally lost to the

atmosphere, but the process of anaerobic digestion allows the methane to be captured. Due to global interest in reducing GHG emissions, it is anticipated that anaerobic digesters could be installed to reduce methane emissions from wastewater treatment facilities more commonly. Methane is not only a GHG; it is also a source of energy when it is burned. As a result, power generators can be installed at wastewater treatment facilities to burn the methane emitted from anaerobic digesters and the electricity can be used to power equipment at the facility.

Integrating the SAP with Other Economic and Development Responsibilities.

There are other entities (taxing districts) that are separate from traditional City Departments or Divisions, but given their roles and responsibilities they overlap with the initiatives in the SAP. By finalizing the SAP and integrating its concepts into economic development and redevelopment activities, the City can assure that all decision making reflects the importance of sustainability principles. The Community Redevelopment Agency and the Downtown Development Authority, in particular, are poised to implement some of the goals of the SAP.

Role of the Community Redevelopment Agency.

Chapter 163, Part III, Florida Statutes, as amended ("Redevelopment Act") authorizes a municipality to create a Community Redevelopment Agency ("CRA") after finding that there exists within the municipality slum or blighted areas. The City Commission created the CRA on September 10, 1984 and they sit as its board. The Agency consists of the following two (2) separate Redevelopment Areas comprising approximately 1,399-acres:

- City Center Community Redevelopment Area ("CCCRA"); approximately 940-acres); and
- Northwood/Pleasant City Community Redevelopment Area ("NPCCRA"); approximately 459-acres).

Buy Local
GROW YOUR COMMUNITY WEST PALM BEACH

The West Palm Beach Downtown Development Authority (DDA) and Community Redevelopment Agency (CRA) are encouraging residents and visitors to buy locally. To make that happen, the DDA and CRA worked together to launch a Buy Local campaign in Downtown West Palm Beach, Northwood Village and their surrounding areas – complete with events, contests, discounts, T-shirts and tote bags for 'locals' – in an effort to educate people on the many benefits of shopping close to home.

DOWNTOWN DEVELOPMENT AUTHORITY
WEST PALM BEACH
Always Original

NORTHWOOD Village
Historically Hip

CRA
COMMUNITY REDEVELOPMENT AGENCY
WEST PALM BEACH

The Agency possesses all of the powers necessary to carry-out community redevelopment including the following:

- Installation, construction, or reconstruction of streets, utilities, parks and playgrounds;
- Voluntary or compulsory repair and rehabilitation programs;
- Constructing foundations and platforms for housing;
- Holding, improving, cleaning or preparing property for future construction.

Role of the Downtown Development Authority.

The DDA works to strengthen the local economy and implements programs that maximize the City and CRA investments in improving the urban core of WPB. The agency's support of infill development and other programs that have made the downtown area more attractive for businesses and residential use reduces the pressure on suburban areas of the City, helps to concentrate development in the urbanized area, and promotes "trip capture" by creating an urban district that provides goods, services, jobs, and high quality residential properties. The DDA's programs are carried out with a coordinated approach that integrates marketing and public relations, strategic use of financial incentives, community outreach, education, and grassroots organizing of business and property owners as well as residents in the Downtown area. The DDA promotes, through various campaigns, the "park once" concept for visitors to the downtown who arrive by automobile. The DDA's trolley program carries over half a million riders per year, with steadily increasing ridership.

Role of the Housing Authority.

The WPB Housing Authority ("Authority") was established by the City in 1938 pursuant to Chapter 421, F.S. and the enactment of the National Housing Act of 1937. The City formed the Authority to provide safe, decent and affordable housing to individuals and families with limited financial resources in the area. The Authority began its mission with the construction of Dunbar Village, the oldest public housing



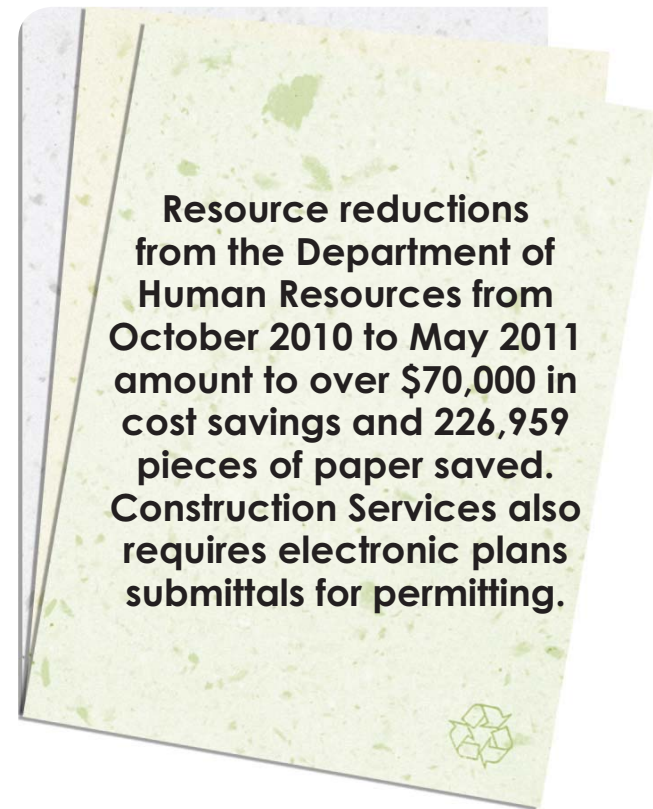
development in the State of Florida. To date, the Authority has been operating public housing for over 65 years. The WPBHA also provides rental assistance through the Housing Choice Voucher Program. This program has 2989 units under contract with the WPBHA. The Authority administers two (2) major housing programs throughout Palm Beach County: the Conventional Public Housing and Section 8 Voucher Program.

Summary of existing Sustainability Initiatives.

It is important to understand where the City is starting from in order to identify Goals and Targets for implementation. In an effort to capture as much information from the City in regards to its current sustainability initiatives, several key steps were taken in the process: a Kick-Off meeting; one-on-one open discussion meetings with key staff; and scripted interviews with key City stakeholders. During the development of the SAP, an initial SAP Kick-off meeting was held and participants included relevant staff from a diversity of City Departments and Divisions. The goal of the Kick-Off meeting was to explain the scope of work for the project and update the assessment of current sustainable practices the City is implementing. A key finding from the Stakeholder Interviews, which included internal City representatives, was that the City is already making great strides in development and implementation of specific sustainable initiatives. Corollary to that was the need to highlight and report on those successes to date. Some highlights of the current sustainable

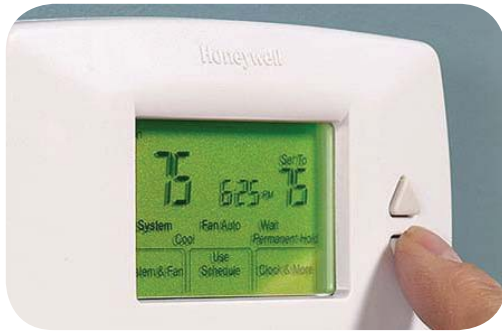
initiatives being implemented include:

- **Resource use and reduction.** Electronic document management, calendaring, double side printing, shifting from paper parking tickets to tokens, use of website and other media for advertising events, using recycled paper for printing, electronic media for meetings to avoid printing agendas and minutes, reducing size of personnel manuals, electronic performance evaluations, electronic mail printing guidelines, online electronic forms and applications, streamlining document routing for signatures/approvals, electronic bid process and printing policies related to photographs for code enforcement.^{xi}
- **Comprehensive Plan.** The City has already incorporated many strong goals, objectives and policies into the Comprehensive Plan related to smart growth, transportation, solid waste reduction, and GHG reductions. The City's Comprehensive Plan has served as a model to other communities in terms of compliance with recent state requirements in Chapter 163, F.S. to address these issues.
- **Lighting policy.** Turning off lights in offices/facilities, retrofits of lighting fixtures in facilities, shifting hours of operation, LEDs in parking light and use of lighting sensors
- **Recycling/Purchasing.** The City recycles office paper, aluminum, glass, transportation/fleet equipment recycling including fluids, tires, batteries and filters, asphalt, concrete, metal scraps, vendors take boxes when delivering products, ink cartridges, materials for children's projects in the Library, green (non-plastic) bags, athletic fields, plant materials through relocation, computer parts and equipment, banners and signage for events, office supplies such as binders. Community Events recycles at all City Events and encourages others to do the same.
- **Travel.** Carpooling, online training, walk-up parking cash-out to reduce vehicle idling, flex work schedules on a limited basis, use of electric vehicles and hybrids, fuel management program on a limited basis, alternative fuels and oils are increasing, bike



spaces in parking garages and in other locations, nitrogen for tire inflation and reduction in fire apparatus responding to routine alarms. The City offers carpool parking spaces for employees that carpool to work. When registered, a carpool parking permit is issued to utilize the carpool parking spaces. Five (5) fleet gas vehicles were eliminated in 2011 and seven (7) electric charging vehicles have been installed for the fleet electric vehicles and two (2) for public use. WPB also offers carpool parking spaces in the Evernia Parking Garage, Clematis Garage, and Banyan Garage for employees that carpool to work as well as bike racks and lockers throughout the downtown area and Northwood Village.

- **Water.** Vehicle washing policy to reduce water use, utilities policies to reduce water loss in distribution system, irrigation system reviews, water efficiency fixtures, use of drip irrigation



and use of native plants in some instances. Parks and Recreation is presently changing out all existing irrigation heads with low volume heads.

- **Equipment / facilities policies.** Power down computer and other equipment in off work hours in City Hall due to automation, meter card recharges, raise thermostats at night, systems to reduce fuel spills, window tinting, green building certifications for certain facilities, improved insulation, air conditioning duct inspections, server reduction and VMware to deploy servers and for tracking performance and reduction of use of refrigerants. Management Information Systems Department change out of computer equipment shows 60% reduction in computer use from existing unit to a more efficient one. Parks and Recreation is using biologic insecticides in the waterfront, dog parks and other areas where necessary. City Center has been fully equipped with a building energy management system which monitors and controls climate, lighting,

ventilation and other aspects of the building's energy consumption.

- **Other actions.** Community gardens, bioswales, food pantry and "dress for success" programs for citizens. Cross training of personnel has occurred to eliminate unnecessary vehicle miles traveled in City services. The City Library also has established "Go Green" Sustainability Kits for families to provide education on recycling, water conservation and how to reduce energy consumption. The City has had a Tree City USA designation for the past twenty (20) years.

Integration of City's Ongoing Infrastructure and Energy Planning Efforts.

A companion effort to this SAP that the City is undertaking is the development of an energy performance contract which will prioritize energy conservation measures that will provide tangible energy savings in identified City facilities. Through this effort, the City will complete energy audits, which will provide specific data on

opportunities for energy savings in municipal buildings, operations and facilities. Further analysis of the financial structure of the energy performance contract will yield proposals to balance cost savings for the City with limited funding options for the future implementation of more sustainable initiatives to help achieve the City's GHG reduction targets.

Also, the City has developed a Drought Response Plan to supplement the current scope and intent of existing water supply management plans and conservation initiatives applying equally to all persons, customers and properties which receive water from the City's Utility. This Plan is meant as an additional means of enhancing mitigation of risks associated with water shortage and drought occurrence through development of more integrated actions that can be exercised prior to, and upon, the start of a drought. The result is a more "customized" adaptive management approach with specific drought triggers to identify and rectify drought exposure. A key deliverable in this Plan will be a "Climate Change White Paper" to address

new or necessary approaches to water management that consider impacts from climate change.

Finally, the Utilities Department is completing an Asset Management Program for its Facilities and Operations with the goal to implement the high priority capital improvement projects identified in an Asset Management Program (AMP) Action Plan. The Department convened an Asset Management Team (“AMT”) comprised of management representatives from all areas of the Department, as well as the Management Information Systems (“MIS”) and Engineering Departments. The AMT collaboratively developed the following asset management vision: To develop an effective asset management organization that reduces the life cycle cost and impacts of asset ownership and enhances customer service through:

- Effective and efficient processes
- Enhanced systems
- Highly trained and motivated staff
- Commitment to continuous improvement.

The AMP includes the following work groups:

- Risk & Compliance Management
- Asset Planning & Budgeting
- Operations & Maintenance
- Stakeholder Communications
- Design & Construction
- Information Management

There are linkages between the AMP and SAP because the individual work groups have developed Action Plans addressing their subject area by: Improvement Area, Best Practice, Schedule Phase, Recommendation, Benefit and Specific Activities.

An Activity in the Sustainability Work Group Action Plan includes: “Coordinate with establishment of an EMS based on ISO 14001 to implement and track the SAP”.⁶ The intent of ISO 14001 is to provide a framework for a holistic, strategic approach to the City’s environmental policy, plans and actions and in many instances, the level of detail in the SAP will be more specific than that found in an ISO 14001 guideline. ISO 14001 Monitoring and Measurement (4.5.1) states:

“The organization shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This shall include the recording of information to track performance, relevant operational controls and conformance with the organization’s environmental objectives and targets.”

6. It specifies a framework of control for an Environmental Management System against which an organization can be certified by a third party.



Since the AMP includes establishing an Environmental Management System (“EMS”) based on ISO 14001, if Monitoring and Measurement 4.5.1 were included, the discussion in the approach of the SAP would include such a monitoring and measurement process through developing the SAP Implementation Strategy and the Annual Report Card. EMS and ISO 14001 guidelines should be chosen that relate to the SAP approach as closely as possible.

Future Climate Implications.

Almost all impacts from climate change relate to increasing air temperatures with global sea level rise largely attributable to

the thermal expansion of the oceans and melting of glaciers and ice sheets. Altered precipitation patterns, heat waves, floods and droughts are all related impacts. But, not all impacts will be uniform and there will be some variation by location due to differences in atmospheric and oceanic circulation. Inundation, erosion and flooding are also resulting impacts. Areas with greater precipitation will see more sewer overflows, more runoff and nonpoint pollution, and infrastructure overloading. Areas of lesser precipitation struggle with meeting water demands and habitat shifts. A great area of uncertainty is the combination and interrelationships of these impacts in the future. In particular, predicted changes in storm intensity and sea level rise create the need for integrated potable water, storm water, and wastewater infrastructure planning and greater interagency coordination.

Even as we ramp up our efforts to mitigate heat-trapping emissions, it is critical that our community start today to prepare for the impacts of a changing climate. Waiting until the impacts grow more severe increases the risk of being poorly equipped to manage the public health, economic, quality of life and environmental consequences. We live in a region of the world that knows well the importance of preparedness. It is time we apply our preparedness doctrine to the risks

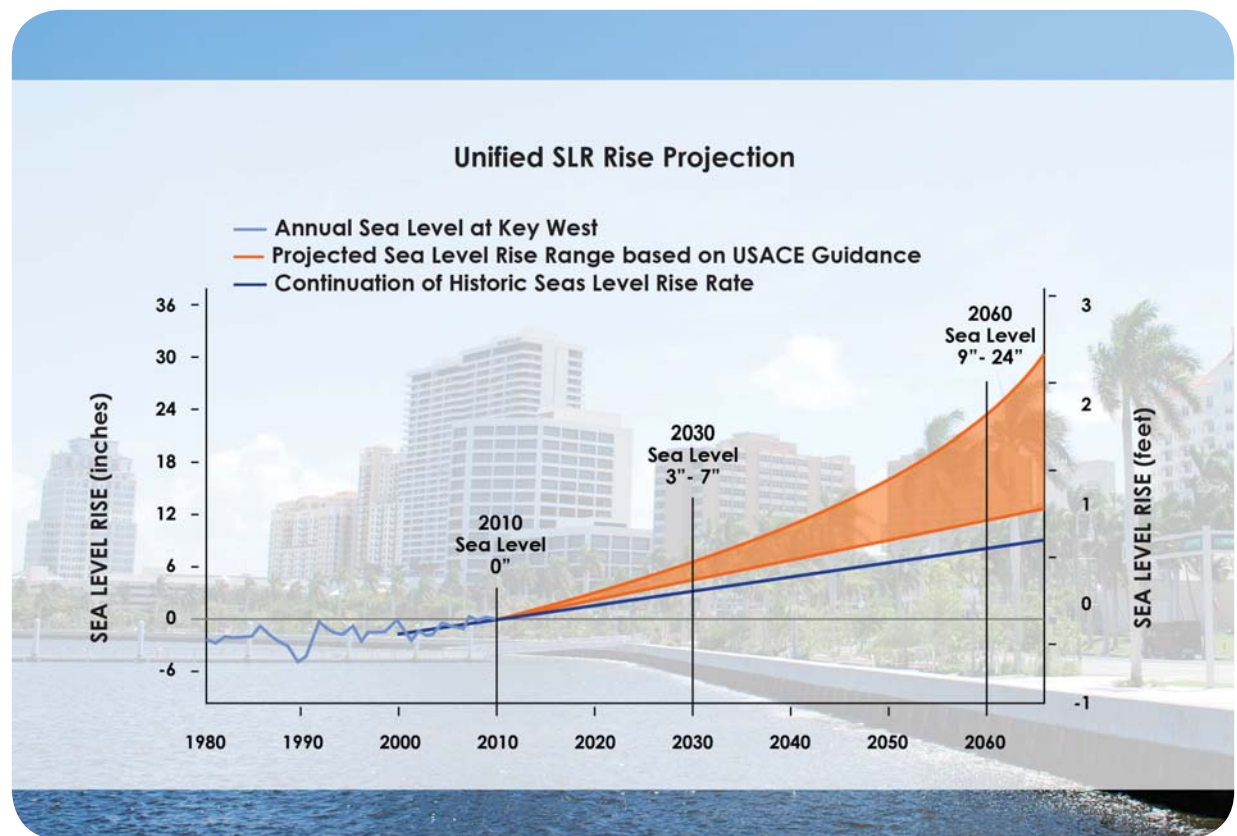


Figure 9: Southeast Regional Climate Compact Projections

associated with climate change. The City, and its natural and water resources, are on the front lines of climate change impacts such as sea level rise and increased hurricane intensity. To address these challenges, the City recognizes the need to simultaneously mitigate GHGs attributable to energy use and prepare for the gradual, but accelerating, impacts of climate change.

Historically, societies and ecosystems have responded to climate change by adjusting and adapting to the natural variability of climate conditions, but the rate that climate change has been occurring in the last century has begun outpacing the conditions of the past. Mitigation⁷ of GHG emissions will affect the magnitude of the climate change impacts to which adaption

7. Mitigation is an intervention to reduce the causes of changes in climate, such as through reducing emissions of greenhouse gases in the atmosphere. The White House Council on Environmental Quality, "Progress Report of the Interagency Climate Change Adaptation Task Force: Recommended Actions in Support of a National Climate Change Adaptation Strategy" (October 5, 2010).



will need to occur.^{8,9} “Vulnerability” to climate change refers to the exposure, sensitivity, and adaptive capacity of systems to climate change (Intergovernmental Panel on Climate Change).¹⁰ Mitigation of GHG emissions and adaptation to climate change are inextricably linked, and both are required to reduce the impacts that have been occurring or will occur in the future.¹¹ Resilience to climate change is the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy and the environment (Council on Environmental Quality “CEQ” 2010). It is this final response of “resilience” that the City seeks to achieve.

The Southeast Florida Regional Climate Change Compact (the “Compact”) is a joint commitment of Monroe, Broward, Miami-

8. Adaptation is the adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects. *Id.*

9. Adaptation is the adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects. *Id.*

10. Differences in geological, oceanographic and biological processes can also lead to substantially different impacts on a single coastal system at different locations. Some global patterns and obvious areas of vulnerability are clear, however, estuaries, coral reefs, and ice-dominated coasts appear most vulnerable to either climate change or associated sea-level rise and changes. Low-lying coastal wetlands, small islands, sand and gravel beaches and soft rock cliffs may also experience significant changes (IPCC, 2001).

11. *Id.*

Dade and Palm Beach Counties to partner in mitigating the causes and adapting to the consequences of climate change. Formalized in 2009, following the Southeast Florida Climate Leadership Summit, elected officials came together to discuss challenges and strategies for responding to the impacts of climate change. The Compact outlines a collaborative effort to participate in a Regional Climate Team toward the development of a Southeast Florida Regional Climate Change Action Plan. Extensive research is underway on this important issue and better projections will no doubt be forthcoming. There does not appear to have been a significant difference in sea level rise during the 20th Century between Southeast Florida and globally; therefore, published predictions for global sea level rise are applicable locally. Figure 9 shows the current Unified Sea Level Rise (“SLR”) Project agreed to by the participants in the Southeast Regional Climate Compact.

Climate Change Implications.

Climate change will have a pronounced impact on City Facilities and Operations in the future. The following are some of those implications.

- **Impacts on Habitat.** Plant and animal species will be impacted by ecological disturbances related to climate change -e.g. flooding, storms- and some habitats will change rapidly and others will disappear.

- **Hurricane frequency and duration.** Hurricanes are likely to be more destructive to coastal areas because an elevated sea level will cause higher storm surges that will penetrate further inland and water tables will exacerbate those impacts.
- **Insurance rate increases.** Insurance companies are applying pressure in high-risk areas, essentially saying adapt or pay higher premiums — especially in urban and commercial areas.¹²
- **Ocean Acidification and Coral Reef Degradation.** Oceans are being acidified by carbonic acid formed from dissolved carbon dioxide and a corresponding decrease in pH; this is detrimental to marine resources.
- **Water Supply Impacts.** While the precise level of sea level rise, or speed with which it rises, may not be known, sea level rise will reduce the amount of fresh water both from surface and groundwater available for potable water use.
- **Wastewater Impacts.** Impacts to treatment processes (such as those related to increased chlorides), system hydraulics and conveyance facilities may occur at pump stations, plants and distribution lines.

12. The reinsurance giant Swiss Re, for example, has said that if the shore communities of four (4) Gulf Coast states choose not to implement adaptation strategies, they could see annual climate-change related damages jump 65 percent a year to \$23 billion by 2030. Leslie Kaufman, "A City Prepares for a Warm Long-Term Forecast", *Ney York Times*, May 22, 2011.

- **Stormwater Management.** Drainage and stormwater structures will diminish in their effectiveness to direct and capture stormwater flows, taking place over a gradual progression reducing the difference between water levels on either side of a flood control structure.
- **Water Quality Impacts.** More intense storms will result in increased stormwater and non-point runoff, increased algae growth, higher levels of water quality indicators such as fecal coliform bacteria and turbidity, pH changes and higher water temperatures.
- **Additional Infrastructure Considerations.** Future impacts to hospitals, schools, libraries, transportation facilities, multi-modal stations and, commercial and residential centers.

Adaptation and resilience will initially add a further dimension of complexity to already complex urban development and City infrastructure projects, where the primary risk management focus has been reducing liabilities and ensuring near-term financial returns. Introducing resilience as a new performance requirement into the conventional process of upgrading specific urban districts and service systems involves the addition of measures that have not historically been associated with industry's way of creating new property value or revenue streams.^{xii}



Recommendations on new initiatives to meet targets.

Based on observations of the Team, the Stakeholder Interview process and sustainability summits, the Workshop and the previous work of the City Green Task Force, the following Goals have been identified. Targets/Trends, Indicators, Actions/Programs and associated timeframes are included in the SAP Implementation Strategy in Appendix A. Estimated costs are included if the funds for that particular Action or Program item can actually be estimated. The SAP Implementation Strategy will include further detail in the Implementation Strategy to be



fully vetted with appropriate staff over the next six (6) months. This Implementation Strategy is designed to assist the City in achieving the Targets/Goals set forth under Scenario 3 of the GHG emissions forecast, a 19% reduction in GHG emissions by 2018, a 32% reduction in GHG emissions by 2025 and a 37% reduction in GHG emissions by 2035.

Implementation Strategy:

Path to Success:

Committed Leadership that is Accountable for Success.

There are numerous success stories in terms of cities becoming "sustainable".^{xiii} Many of them have diverse populations, economic circumstances, urban/suburban geographies and engaged business communities. While WPB has taken several important steps to begin implementing an approach to sustainability (such as creating an office of Sustainability, completing the SAP and GHG inventory), establishing a Sustainability Advisory Committee, the leadership framework needs clarity and improvement. Deloitte conducted a survey of federal executives (in 2010) and found that "Some of those who say they have not been able to promote sustainability claim to be powerless to affect change. In an optional elaboration section, several report that they are limited by agency rules or hindered by the fact that agency management and leadership do not listen to their ideas." The survey also

found "Administration pressure is significantly more likely to drive agency action than public pressure."^{xiv} There is a growing recognition among local elected officials and managers that addressing energy issues carries the potential to enhance ongoing programs and improve efficiency. Clear metrics were suggested as a way to improve accountability. The success of the SAP will lie in the political will to make decisions commensurate with its broader goals.

Coordination among Departments.

While City leadership understands the importance of these initiatives, and their cost saving benefits, there is a disconnect across departments in terms of developing and implementing policies to meet a cohesive centralized goal of making comprehensive "sustainable" decisions. Sustainability is holistic: it cuts across multiple areas of knowledge, forms and areas of law, and institutional mandates but there are several challenges to implementation that are general and specific to certain departments. City agencies whose core missions have historically addressed other issues are sometimes reluctant to dedicate sufficient human and fiscal resources to sustainability absent clear coordination and direction. But sustainability programs can enhance ongoing governmental activities, such as land use, services and economic development functions. There are ways local governments can reduce GHG emissions that may be associated with current programs or existing service delivery. For

instance, streets and right-of-ways should be viewed as a public asset beyond just their use as transportation corridors. Treating them more as linear parks, particularly along the waterfront and in residential areas, is critical to creating high quality places.^{xv}

Formal and informal arrangements for inter-departmental coordination and collaboration are also necessary. For instance, an important point that was made during the stakeholder process was the need for quantifiable return on investment from the Actions, Projects and Programs in the SAP. Another suggestion is to create a list of sustainability-related factors for



A first step in policy coordination is to identify the existing policies, goals and procedures in the various departments that affect or are affected by the SAP.

Departments and Divisions to consider during the budgeting process. Leadership team meetings were suggested as a mechanism to increase this coordination.

Education and Improving Awareness.

Overall, education is a cornerstone of the SAP for City Facilities and Operations. Deloitte found in a survey of federal agencies that better education, training, and engagement can help their agency implement more sustainable practices. Several interviewees in the Stakeholder Interview process emphasized that the City needed a “cultural shift” so that practices become second nature such as turning off lights and using daylighting where appropriate (light harvesting), combating the notion that native plants are not as attractive as non-native species and the

need for rehabilitation of landscaping after events. City Staff understand the mission of the Office of Sustainability with over 65% responding to the Employee Survey as the Office’s area of responsibility being: 1) assisting the City of West Palm Beach in reducing its carbon footprint; 2) promoting natural resource conservation or 3) saving the City money through energy and water efficiency upgrades. Yet 97% of those who responded did not know who their Departmental representative was to the City’s “Green” or “Sustainability Team”. All of those who responded stated that if they learned a sustainable/conservation practice in the office, they would employee that at home if they could. It is clear that Staff is supportive and has a basic understanding of what the City is trying to accomplish with the Office of Sustainability, but there is room for

improvement in terms of institutionalizing the internal team and implementing the mission in day to day practice. Hold regular “brown bag” events for each City department on various topics related to the climate change issue and on actions employees can take to reduce their own GHG emissions.

Integrating Policies and Procedures.

Another significant challenge is that while the City has a model Comprehensive Plan in terms of the inclusion of GHG reduction strategies, there is a disconnect between the implementing Goals, Objectives and Policies in the Comprehensive Plan and implementation of the City’s Code of Ordinances.^{xvi} Some of this coordination is taking place in certain instances, but overall there is room for improvement. For the City to truly be committed to making the SAP a

Goals for City Facilities and Operations

CF 1.0:	Optimize the management, planning & maintenance of assets to reduce GHG emissions in City Operations and Facilities.
CF 2.0:	Embed sustainability principles into all decision-making and planning across the City.
CF 3.0:	Modify procurement policy to integrate “green” standards in purchasing for services and products.
CF 4.0:	Reduce fuel use of City’s fleet.
CF 5.0:	Reduce GHG emissions from employee commuting by promoting workplace flexibility and increasing telecommute and alternate workplace participation rates.
CF 6.0:	Highlight City’s Sustainability commitment through education, awards and designations.
CF 7.0:	Decrease City’s resource consumption of office products and packaging.
CF 8.0:	Prepare City to be resilient for the impacts of climate change.

reality, the concepts from the SAP should be fully integrated into all Elements of the Comprehensive Plan, and in turn, carried out through the Code of Ordinances. For instance, Chapter 66 (Procurement) could be updated to include another concept in Sec. 66-4 – Purpose and Definitions relative to promoting energy efficient and certified green products (with an appropriate list of green designations). An example would be for the City’s pertinent Code provisions such as Chapter 94 (Zoning and Land Development Regulations), Article XVII (Flood Prevention and Control), Article XIV (Landscaping, Land Clearing and Tree Protection), which control the bulk of these decisions, to be better linked to the Comprehensive Plan’s vision and directives, and coordinated to incorporate concepts such as transit oriented design, green infrastructure practices and enhancement of urban resources. For the City to truly be committed to making the SAP a reality, the concepts from the SAP should be fully integrated into all Elements of the Comprehensive Plan and all sections of the Code. A Sustainable Code should:

- Be comprehensive covering all aspects of sustainability
- Integrate nature and man (man-made systems)
- Be progressive and draw upon useful features of other codes
- Be based on sustainable development, comprehensive policies and plan for long-term civic engagement

“ You cannot solve a problem at the same level of consciousness that created it.”

Albert Einstein

- Be tailored to local/regional climate, ecology, & culture^{xvii}
- Be clear in conveying the concepts such that implementation is achievable

Funding Challenges. Dedicated funding of a sustainability office institutionalizes energy management efforts in a local government. If climate protection and energy efficiency are ancillary functions within an agency, and are not directly budgeted for, they are less likely to be sustained.^{xviii} Cost savings are available to local governments through efficiencies that reduce their own energy usage, which in turn can generate broader support for sustainability efforts. Another example is utilizing funds saved from a parking cash out program to pay for other transportation-related sustainability initiatives. To address funding issues, the Team looked for opportunities to identify new funds such as grants or create programs that self-generate revenue that can be targeted to implement more initiatives of the SAP. The existence of local tax assessment authority over geographic areas may offer a unique opportunity for financing

comprehensive, place-centered resilience upgrades. In principle, if it can be established that climate or disaster risks are directly lowering property values, then value capture mechanisms (such as tax increment financing) could be used to finance the measures to reduce these risks, and thereby increase those values.

In addition to this strategy to address funding, there will be a significant need to reach out to other partners such as the Downtown Development Authority and Chamber of Commerce in conjunction with overall branding efforts for the City’s Sustainability Office and the SAP. This coordination will need to occur externally and internally to cut across inter-departmental missions and programs. City Leadership must recognize and be willing to accept the fact that while programs to increase energy efficiency or sustainability are cost effective in the long-run, they may divert resources away from other policy priorities in the short-run.

Monitoring and Reporting. While there are well-established ways of measuring performance in other environmental areas such as water quality, standards for measuring the sustainability of cities are only now emerging.^{xix} Each criterion in the checklist is assigned a point value and local governments that accumulate a sufficient number to meet a minimum total point value are certified as Green Local Government (“GLG”)s Florida Green Building Coalition

("FGBC"), 2008b). The overall focus of the FGBC GLG standard is to improve the environmental performance of participating local governments but, the standard does not specifically identify any associated economic or equity/social outcomes. The certification follows a self-reporting system in which each municipality assesses the environmental performance of its own governmental functions and reports it to FGBC. "While voluntary, nongovernmental green certification programs such as FGBC's GLG standard are changing the way local governments approach planning, such programs need to widen their focus to include socioeconomic aspects so that their outcomes are better aligned with contemporary global sustainability objectives." Seeking the Green Certification should be harmonized with the development of the EMS based on ISO 14001 standards.



1

Natural Resources and Water Conservation



The City includes almost 15,000 acres of Parks and Open/Green Spaces including Grassy Waters Preserve, the City's water supply.

It is important that residents and businesses do not forget that even as urban dwellers, we are still a part of the larger ecosystem, one that supplies and contributes to the quality of the air we breathe and water we drink. In this process, we have to recognize that individuals define their "environment" differently, whether it's their home, city block, or ecosystem.^x The SAP should apply a broad definition of "environment" to include issues related to the diverse habitats and species populations within the City's community, both urban and suburban.

WPB is part of a very unique collection of larger terrestrial and coastal ecosystems. Unique to WPB, is the linkage between its natural areas and its water supply as illustrated through the City's management of Grassy Waters Preserve ("GWP"). Another important linkage is that the City is bordered by the Intracoastal Waterway, with its health inextricably linked to the economic vitality of the City's waterfront. Maintaining the health of these systems is critical, and while it is sometimes easier to focus upon the larger components of the ecosystem, the City's

urban resources must be protected and enhanced as well as what we consider to be the more traditional natural resources of an ecosystem. It is also critical that we protect and enhance the biodiversity that keeps both of these types of ecosystems healthy because of the multiple benefits they provide. Finally, numerous local governments are employing cost-effective techniques to create and enhance green infrastructure¹³, such as stormwater projects, which can improve services to residents and businesses while protecting the City's natural resources.

Land: Ecosystems and Urban Resources.

Managed by the City's Public Utilities Department, GWP is a 20-square-mile wetlands wildlife sanctuary that provides fresh drinking water to over 130,000 people in WPB, the Town of Palm Beach, Town of South Palm Beach, and surrounding areas. The majority of the City's raw water comes from GWP with the remaining 25% of water supply needs met by deliveries from Lake Okeechobee. Water is pumped to the M-Canal where it flows into Lake Mangonia and Clear Lake and then ultimately into the City's Water Treatment Plant for processing.

GWP also includes nature center pavilions,

13. The term has been defined as "an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations" (Benedict and McMahon 2002).

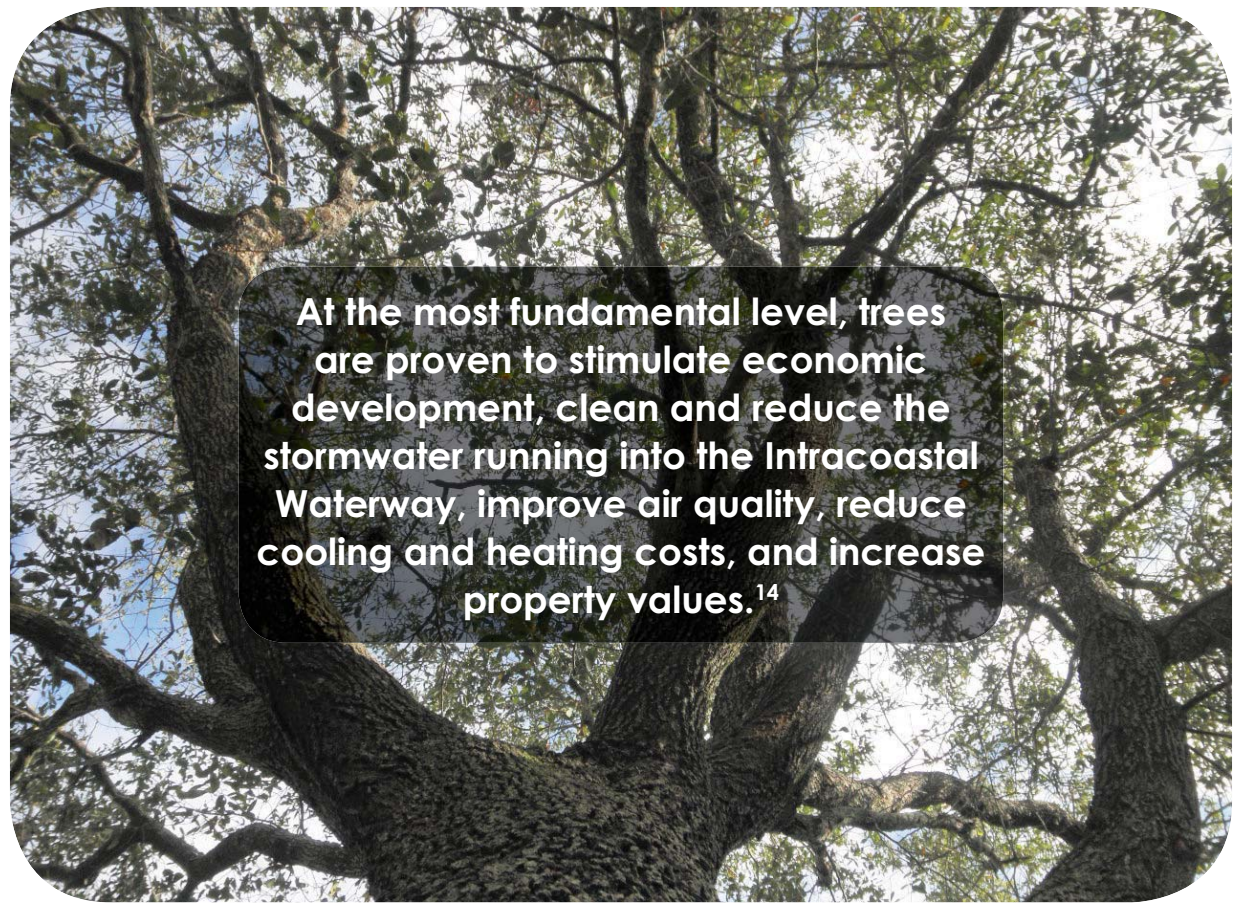
boardwalk trails, hiking, canoeing, educational programs and other entertainment or recreational opportunities. GWP was historically the headwaters of the Everglades system which expands south to Florida Bay. GWP is separated into north and south sides by Northlake Boulevard. The water is used for drinking water supply and environmental purposes by maintaining water levels in the wetlands at specified stage elevations. Habitat types are predominantly sawgrass prairie and cypress marsh.

A Goal for the SAP is to incorporate GWP into CO₂ storage planning for WPB in the future. GWP provides an extensive land base for the storage and sequestration of CO₂ that works in tandem with, and expands, the value of land for water production capacity already in place. The extensive natural systems that store and cleanse water also incorporate CO₂ into the leaves, stems, and roots of the vegetation comprising the systems as well sequestering CO₂ in peat, muck and other soils formed under the water surface. Developing an understanding of the current CO₂ storage quantity and rates of these systems is the first step in identifying the CO₂ sink potential for GWP. Additional actions that could increase the CO₂ storage or sequestration rates, especially in conjunction with habitat improvements from nutrient reductions or other restoration activities can build upon the base obtained from understanding existing rates of storage.



The initial assessment requires understanding of the composition of existing vegetation systems within GWP. Mapping efforts supplemented by targeted field reviews will provide categories of vegetation types for which standing biomass and CO₂ storage rates can be determined. These mapping efforts should include a breakdown of canopy, shrub, and herbaceous composition as CO₂ storage/turnover within the three (3) types can vary because of the lifespan of the above-ground material (i.e. a tree-trunk holds CO₂ differently than an annual flowering marsh plant). In addition, research into the rates of CO₂ storage and the amounts already stored within these materials will provide data for identifying future CO₂ storage capacity for GWP. This analysis will also require an understanding that the rates of peat/muck production and CO₂ storage within roots will supplement the understanding of above-ground CO₂ storage and provide guidance on desirable water levels and hydrological regimes that could be coordinated with water production to increase capacity for CO₂ storage.

Once the conditions and rates of existing natural systems and conditions within GWP are understood, a system to document the CO₂ storage provided over time and track CO₂ sinks that offset other CO₂ sources within WPB will be needed. This system will need to address changes in CO₂ storage caused by management activities within GWP such as prescribed fire (that can release CO₂ into the atmosphere, but is an important



At the most fundamental level, trees are proven to stimulate economic development, clean and reduce the stormwater running into the Intracoastal Waterway, improve air quality, reduce cooling and heating costs, and increase property values.¹⁴

tool for natural systems) and water level fluctuations that may alter CO₂ storage rates or quantities. In addition, potential enhancements to GWP that would increase CO₂ storage/sequestration coupled with ecosystem restoration activities should be identified and implemented. Where possible, these enhancements should be designed to address multiple goals within GWP, including nutrient reduction from historical agricultural operations, within and adjacent to GWP, exotic species removal coupled with

vegetation enhancements, and/or water storage and quality improvements.

Communities can mitigate climate change through reducing fossil fuel consumption

14. A mature tree can absorb CO₂ at a rate of 48 lbs/year. Each mature tree releases enough oxygen to support 2 adults. Trees can reduce summer cooling costs by up to 20-50%. Research indicates that a mature tree intercepts about 1,000 gallons of rainfall per year in their crowns, reducing runoff and providing cleaner water. Healthy, mature trees can increase property values by as much as 10%. <http://www.cityofchicago.org>.

and good management of its urban forest. Urban trees can reduce concentrations of atmospheric CO₂ by storing CO₂ in their roots, stems, and branches. Tree roots absorb water pollutants; eight (8) of which can be measured: Biological Oxygen Demand, Cadmium, Copper, Lead, Nitrogen, Phosphorus, Suspended Solids, and Zinc.

The following crown cover amounts are recommended by American Forests as a minimum for community health:

- 15% in the Downtown
- 25% in urban residential areas
- 50% in suburban residential areas
- 40% overall

Nationally, urban forests in the U.S. are estimated to contain about 3.8 billion trees, with an estimated structural asset value of \$2.4 trillion. The value of an existing mature tree is exponentially higher than a smaller, younger tree, when one considers ecological services, property values and other measures. A healthy urban forest has several benefits, including:

- Reducing the energy consumption associated with air conditioning buildings by providing shade
- Reducing local ambient temperatures by shading paved and dark colored surfaces like streets and parking lots that absorb and store energy rather than reflecting it

- Intercepting and storing rainwater, thereby reducing water runoff volume
- Improving community quality of life through beautification and by reducing noise pollution and encouraging pedestrian traffic

This is an absolutely critical concept for redevelopment areas and projects as street trees in urban areas have also been proven to increase retail spending and time spent by visitors on retail streets.

Most urban forests do not require intensive management and the overall benefits of urban forests likely outweigh their planning and management costs. The associated costs to plan, plant and maintain natural resources are often neglected in favor of hard infrastructure such as roads and buildings. A new paradigm of integrated infrastructure that includes both gray (built) and green (living) is needed to sustain the City's growth as well as to mitigate and adapt to the changing climate. Trees will play a significant role in this new paradigm. When tree characteristics and site characteristics match, the result is "the right tree in the right place", an internationally recognized arboriculture standard.

The management of urban forests typically involves a variety of activities such as inventorying tree populations; enacting tree and land use planning ordinances and policies; developing and implementing long-term management and maintenance plans, annual work plans, and budgets;



and promoting community education and participation. Tools exist to help assess and value trees and the urban forest such as:

- The Street Tree Management Tool for Urban Forest Managers ("STRATUM") uses this data to calculate the ecological and economic value of the urban forest.
- The Urban Forest Effects model ("UFORE") assesses the composition, condition, and ecological values of an entire urban forest ecosystem.

- CITYgreen is another tool that analyzes the ecological and economic benefits of tree canopy and other green space.

The City can assess these types of tools to help establish a baseline and economic value for its trees and urban forests. The species and plant communities that attain biomass more quickly will sequester CO₂ faster, but until the City assesses and values its tree canopy and urban forest, the true potential for CO₂ sequestration benefits, in both GWP and citywide, cannot be determined.

Landscape ordinances typically provide for the preservation of natural features such as wetlands, erodible slopes, special native habitats and specimen trees. In some communities, the total context of their ordinance is the protection of the public water supply while in other communities it is the tree canopy that is important to preserve. Many communities enact ordinances merely for beauty or economic development but there are other reasons such as a mechanism to implement the SAP. Upon assessing the baseline and value of the City's tree canopy and the value of its urban forest, the City's landscape code will achieve tree canopy and urban forest goals. There are numerous examples of landscape ordinances that address tree canopy and urban forest goals, for instance, Lexington, Kentucky has set standards for the amount of tree canopy and shade that must be provided in each zoning district in

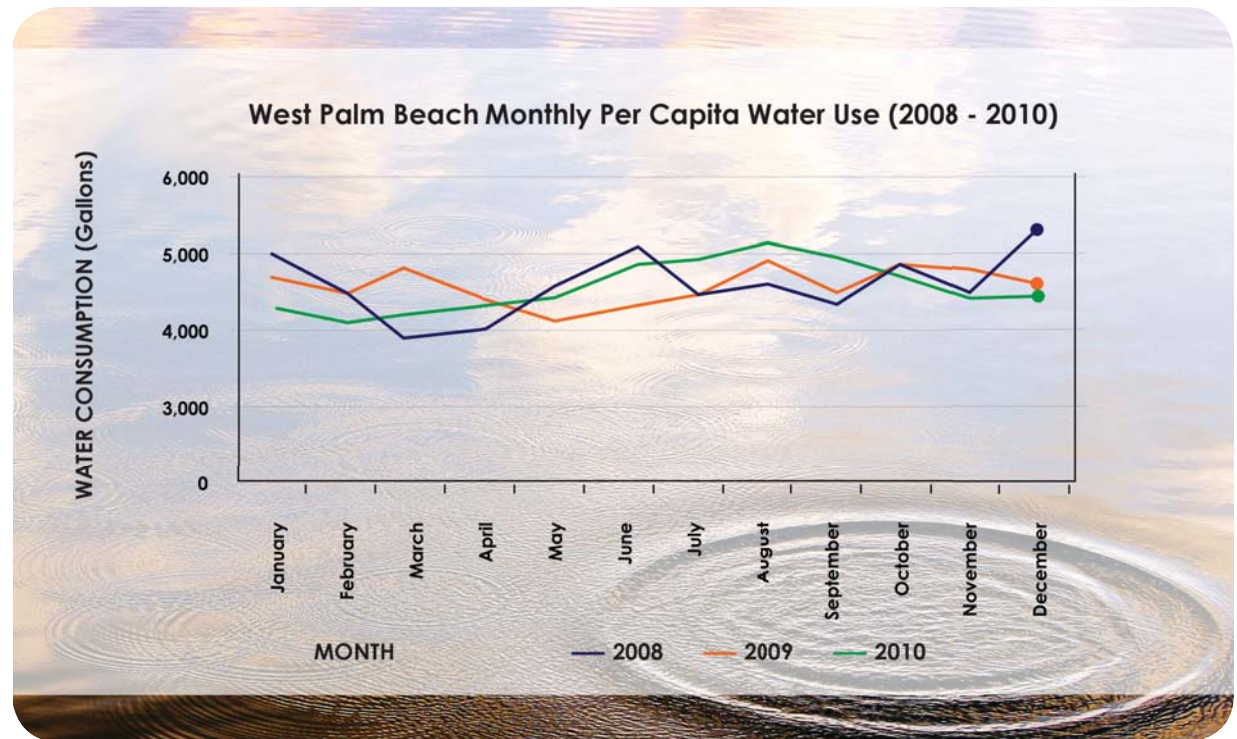


Figure 10. WPB Monthly Per Capita Water Use (2008 - 2010)

the community.^{xxii} Recent local examples of new important landscape codes include the City of Lake Worth (Chapter 23, Article XXI), the City of Oviedo (Article XII) and the City of Greenacres (recently adopted in May 2011) which all include detailed provisions for managing species and removal of trees. A dedicated WPB Tree Board could facilitate development and maintenance of these portions of the Landscape Code as well as maintain City tree canopy goals.

To maintain natural resources in a sustainable manner, the City must also reduce dependence on chemical fertilizers,

pesticides, and herbicides and increase use of Integrated Pest Management ("IPM") strategies for pest management. The City is already piloting these technologies in some City facilities and this is very critical to implement in areas proximate to the City's water supply, for instance, Clear Lake and Lake Mangonia. These types of practices can shift from potentially harmful chemicals to training maintenance and management of the City's sustainable landscapes. Part of this strategy should include use of composted organic matter to build soil health. The City can lead by example and embrace preventive non-chemical

strategies as a priority, define acceptable use of the least toxic chemicals to be used only as a last resort, and prohibit chemicals that are known to cause adverse health and environmental effects, including cancer, neurological effects, reproductive impacts, immune and respiratory system damage, and water contamination.

Water: Protecting Quantity.

As stated earlier, most of the City's raw water comes from the GWP which is then pumped to the M-Canal where it flows

into Lake Mangonia and Clear Lake and then ultimately into the City's Water Treatment Plant for processing. All of these components collectively must be considered as the City's water infrastructure. Proper protection and wise use of our water resources, along with maintenance of the City's water supply system, will help sustain this system so that WPB residents can continue to have clean, readily-available water for generations to come. Climate and environmental changes, and community growth have exacerbated water issues, reducing available water, and

requiring municipalities across the U.S. to develop plans to mitigate possible issues. It is our current generation's responsibility to protect the water and waterfront for the future. Excessive waste of potable water is another unsustainable habit which warrants attention.

From the standpoint of protecting GWP, long-term protection of the resource is challenged by a number of impacts stemming from land use alterations and changes adjacent, and immediately proximate, to the wetland system. Immediately adjacent, there are several transportation projects planned and moving forward that will severely impact and segregate the sheet-flow dynamics of the buffer wetlands of, in particular, Andros Isles and Baywinds, These activities will deflect conveyance presently operable for freshwater discharge into GWP from these buffer wetland preserves. Runoff from proposed roadways, even when shunted back into adjacent stormwater systems, will ultimately alter and degrade present water quality; thus impacting discharges presently relied on to augment wetland functions. Included in these peripheral impacts is light and noise pollution that will ultimately disrupt wildlife behavioral aspects; including, but not limited to foraging practices, vocalization patterns, mating rituals, and nesting success to a growing number of Threatened and Endangered Species which include Woodstorks, Rosette Spoonbills, Ibis, Snowy Egrets and the Everglades Snail



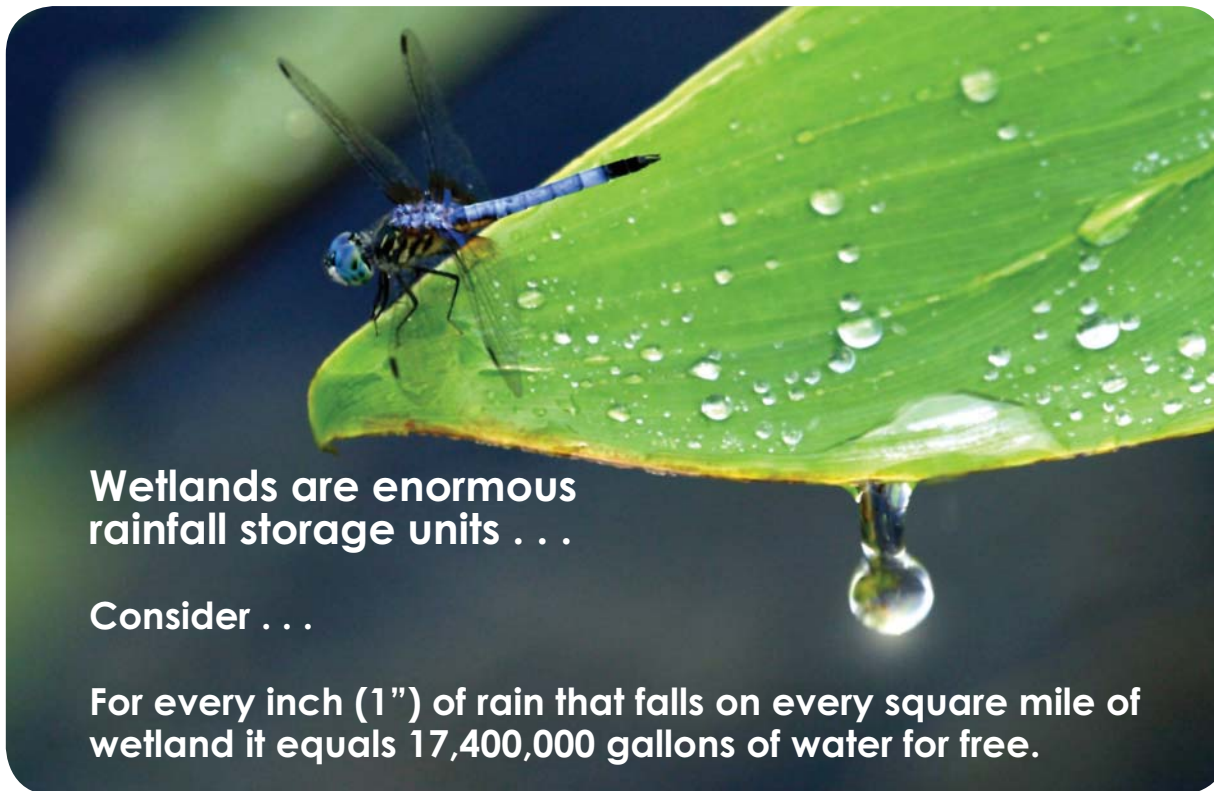
Kite. Pollution from exhaust and spills will incrementally degrade areas well beyond the immediate front print of the roadways. The extensive wildlife viewing opportunities afforded to the public adjacent to such proposed roadways will compromise and diminish the experiential opportunities on an immediate basis, as well as, have a multi-generational impact far into the future.

From a cumulative effect, the infrastructural components of roadways, beyond their visual impacts, translate often times into more distant affects which may because of their more detached relationships do far

greater harm over the long-term than some of the more direct impacts. To that end, roadways accommodate growth patterns that often add ever greater demands on the already limited water resource base of the immediate regional supply. Reliance on additional wellfields to augment such growth patterns is in itself non-sustainable from the standpoint that groundwater and surface water are connected systems, and all withdrawals, even from domestic wells or from utilities or agriculture, must figure into a comprehensive groundwater budget, which does not yet exist.

Negligence in protecting such large recipient catchments such as GWP will lead to the City's own water-supply shortfalls in the future hydrologic uncertainties, already suggested to occur under Climate Change scenarios in South Florida and cannot be dismissed further by allowing or tolerating degradation of GWP ecological and hydrologic benefits that presently add vast amounts of recharge to the regions groundwater component. Finally, through its environmental systems operation, GWP enhances sequestration of GHGs that may play a critical position in the City's financial future when final GHG regulation and management regimes are developed and implemented within the U.S. Under such a system of GHG accounting the most detrimental element that would affect Grassy Waters functional sequestration abilities is the lack of persistent hydrology. Thus, in the final analysis, hydrology is the most critical driver of GWP's present and future integrity. Any imbalance in the annual fluxing of rainfall capture and storage causes a cascading and rippling negative effect that compromises the value, function, and benefits it bestows.

Climate change is predicted to create longer periods of drought, shifting the patterns of rainfall which we have come to rely upon making water resource management even more challenging in the years to come. At least 36 states are expecting local, regional, or statewide water shortages by 2013. On top of these



Wetlands are enormous rainfall storage units . . .

Consider . . .

For every inch (1") of rain that falls on every square mile of wetland it equals 17,400,000 gallons of water for free.

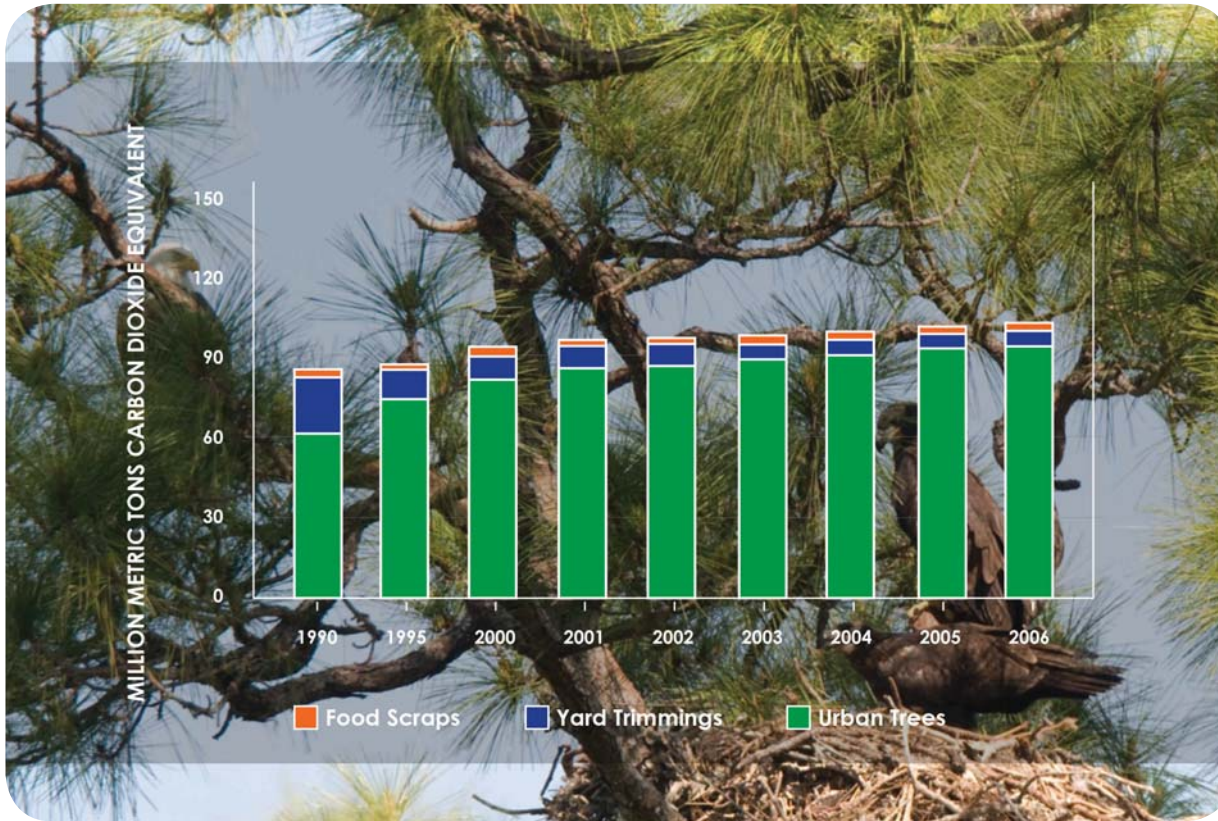


Figure 11: Carbon Sequestration in the U.S.: Urban Trees, Yard Trimmings, and Food Scraps. 1990, 1995, and 2000-2006.

Source: U.S. EPA estimates

challenges, water plants throughout the nation consume about 56 billion kilowatt-hours per year of energy to treat and distribute water, which is enough energy to power more than 5 million homes for an entire year. Figure 10 reflects the 2008, 2009 and 2010 citywide monthly water use per capita. In 2007, there was a significant drought throughout south Florida which served as a catalyst for numerous actions including the development of the previously

mentioned Drought Response Plan.

Water demand has a large impact on these relationships. According to the SFWMD, outdoor irrigation accounts for up to 50% of water use in Florida, and up to 50% of the water applied to lawns is lost to evaporation or runoff throughout the entirety of the sixteen (16) counties of the SFWMD. While the SFWMD controls water use and supply through law and regulation, there

is still much a local government can do to enhance water conservation practices.

The average water consumption rate for the City's Service Area is 269 gallons per person per day. Pursuant to the City's Consumptive Use Permit, per capita use of potable water within the Service Area shall be decreased to 262 gallons per capita per day by 2011, and further to 257 gallons per capita per day by 2016.

While it can be expensive to invest in newer and more water efficient appliances in homes and businesses, the investment cuts costs and saves money each year. At the very least, knowledge of water conservation practices helps reduce the amount of water, and thereby, energy consumed. Three (3) trillion gallons of water and \$18 billion per year could be saved if every American household installed water-efficient appliances. According to the EPA, letting a faucet run for five (5) minutes requires as much energy as lighting a 60-watt bulb for 14 hours. Not only will more efficient practices help the environment, but it also reduces everyday costs—the average U.S. household spends \$500 per year on water and sewer bills.^{xviii} One area where the City can go even further with its efforts is to review the various water standards and adopt a technical amendment to the Florida Building Code requiring high water efficiency fixtures and appliances such as that Miami-Dade County adopted.

A great deal of energy is required to treat and deliver water to end-users in homes and businesses and to collect and treat wastewater after use. As a result, improving the efficiency of the City's water treatment and delivery system (and controlling end use demand) has the potential to significantly reduce energy demand and GHG emissions from water and wastewater processes. Therefore, tracking the City's water usage (described in "City Operations and Facilities") is just as important as tracking energy and other sources of GHGs. It will be essential for the City to keep in mind that reducing water consumption will have benefits for both natural resource conservation as well as GHG reduction.

Water: Protecting Quality and Green Infrastructure.

The City is served by a system of primary and tributary canals and swale areas which are man-made facilities constructed originally to drain the Everglades, and currently used to accommodate the flow of water and for stormwater management purposes. The City's own stormwater facilities are maintained by the Engineering and Public Works departments, and are of vital importance since the water flowing through them drains not only the City, but inland City areas as well. All demolition and new construction permits require submittal of a Stormwater Pollution Prevention Plan ("SWPPP") pursuant to the City's Stormwater Management Program.

Some Services of Wetlands:

- **Capture, storage, groundwater & regional aquifer recharge**
- **Storage and recycling of nutrients**
- **Natural flood control & flow regulation**
- **Saltwater intrusion control**
- **Maintenance of migratory & nursery habitats**
- **Maintenance of food chain dynamics**
- **Maintenance of biological & genetic diversity**
- **Life support for endangered species**
- **Climatic stabilization**
- **Carbon sequestration**

In August 2000, the City released the City of West Palm Beach Storm Water Master Plan that included an inventory and assessment of the City's storm water system and provided a list of recommended projects designed to improve the system. Cost effective solutions were assessed and prioritized to meet short and long term goals. To date, several projects have been completed already. The City's Public Utilities Department oversees the operation of a City-wide stormwater utility designed to achieve certain levels of service (3-year,

1-hour storm for the storm-sewer system and a 25-year, 24-hour storm) intended to reduce the risk of flooding and improve stormwater runoff quality. The City charges a monthly stormwater fee on all developed properties within municipal limits to fund improvements necessary to maintain the adopted service levels.

"Green infrastructure" approaches have been recognized to help achieve GHG mitigation and climate change adaptation goals because their benefits are also

generally related to their ability to moderate the impacts of climate change such as extreme precipitation or temperature.¹⁵ On a smaller scale, the City's green infrastructure includes trees as well as soil, but could include more rain gardens, porous pavement and green roofs. All of these features can also be integrated into the design of a project in terms of their artistic value as well through incorporating EcoArt principles into the Code of Ordinances. In many instances, maintenance and enhancement of green infrastructure involves stewardship of the natural setting (e.g. preventing and controlling exotic species invasions, maintaining fire regimes, restoring wetlands, etc.). This concept is also known as Ecosystem Based Adaptation ("EBA"). For instance in the context of the City, natural communities are just as important for protecting people and the built environment from the negative consequences of climate change as "grey infrastructure" such as seawalls, stormwater drains.

A concurrent benefit is that green infrastructure attributes provide these resiliency benefits at a much lower cost than constructed infrastructure components.¹⁶ Green infrastructure approaches can be

15. Foster, Lowe and Winkelman, "The Value of Green Infrastructure for Urban Climate Adaptation", February 2011.

16. *Id.* 17. *Id.* 18. For instance a 20% tree canopy over a house results in annual cooling savings of 8-18%. *Id.*

implemented at the macro level with larger centralized public projects or at the micro level on private property.¹⁷ Economic values can also be placed on green infrastructure assets in terms of carbon sequestration and the cost savings with maintaining certain habitat functions as opposed to constructed solutions such as sea walls.¹⁸ The City could benefit from considering how green infrastructure practices can achieve resiliency goals with less adverse impact and cost.

Impervious surfaces increase the volume of rain water and pollutants that enter stream systems during storms, causing streambank erosion and sediment and pollutant discharge into the harbor and bay. Examples of ways to treat stormwater on-site include planted medians in streets, green roofs, and 'green' alleys made of porous asphalt (allowing rainwater to seep through), reduce stormwater volume that flows off-site. Well-designed open spaces can also serve as parts of an advanced and integrated stormwater system that promotes stormwater quality and reduce downstream flooding. Utilizing natural systems to manage water resources also has the potential to reduce the need for more energy and CO₂ intensive stormwater infrastructure projects. Bioswales including vegetated swales, grassy swales, bioretention areas, and filter strips— also serve many functions



such as removal of heavy metals, total suspended solids, and oil/grease.^{xxiv} Other benefits include:

- More groundwater recharge.
- Reduced stormwater runoff (including treatment and management of stormwater).
- An increase in the aesthetic value of yards and neighborhoods.
- Increases biodiversity and provides habitat.

Bioswales are often coupled with other watershed friendly landscaping practices like permeable hardscaping. For instance, in Chicago, public alleyways are being repaved with materials that are permeable to water to provide stormwater and combat heat island impacts. The City should incorporate these principles into the Code for redevelopment and development projects (including transportation projects).

Rain gardens capture runoff from impervious surfaces such as roofs and driveways and allow it to seep slowly into the ground, filtering out pollutants including fertilizer, pesticides, oil, heavy metals and other chemicals that are carried with rain water. These pollutants are absorbed by the soil, mulch and plants and removed through the natural biological and chemical process. In addition, rain gardens can help preserve nearby lakes and water bodies by reducing the amount of runoff and filtering pollutants.

Air: Protecting Quality and Reducing GHG Emissions.

Air quality is important because it affects the daily life of the community as well as the environment. Trees provide welcomed shade in the summertime, reducing the urban heat island effect and reducing air conditioning needs for buildings and cars. In addition, urban forestry offers bird habitat, improves air quality, and absorbs greenhouse gas emissions, helping to reduce climate change. Urban trees can affect climate change by directly storing carbon within their tissues and by reducing carbon emissions from power plants through lowered building energy use. Urban trees in the conterminous United States currently store 770 million tons of carbon, valued at \$14.3 billion.

Implementation Strategy:

Path to Success:

With growth and development the City's natural and water resources are under the constant threat of being impacted by adjacent land uses. GWP, Lake Mangonia and Clear Lake must be maintained for the dual benefit of reducing the City's GHG emissions (mitigating the impacts of climate change) and providing adaptation benefits as well as the overriding water supply concerns. On a smaller scale, effective urban forest management of the City's resources has also often been hampered by challenges such as inconsistent management approaches, lack of funding, weak linkages with other resource management programs, and inadequate planning that fails to consider the surrounding ecosystem, the community, and the regional context. The biggest

challenges to protecting the City's natural assets are education on their value and funding of initiatives.

The fact is that the perceived value of natural assets varies greatly among City residents and communities. There are many who influence the urban forest, from home and business owners to large governmental agencies. This mosaic of management creates a variety of maintenance procedures and standards based on the intent and priorities of the landowner. These differences can range from aesthetic opinions and cultural preferences to resource allocation and liability concerns.

To overcome some of these perceptions, the City should use a "systems approach" in communications that includes all natural assets and infrastructure. An example would be to educate residents and businesses about smallscale storm water management.

Goals for Natural Resources and Water Conservation

NR 1.0:	Improve and implement stronger water conservation measures.
NR 2.0:	Differentiate urban ecosystem as an appreciation asset that supports sustainable development.
NR 3.0:	Maximize protection of Grassy Water Preserve and determine the CO2 offset value of the City's natural assets in achieving its GHG Target.
NR 4.0:	Encourage green infrastructure approaches at the site, community, and regional scales to increase resilience to natural hazards (including climate change impacts) and better manage stormwater runoff.
NR 5.0:	Increase multiple uses of open space by maximizing resource efficiency of parks and public property.
NR 6.0:	Reduce use of chemicals entering natural areas and water supply.

The majority of land in WPB that is part of the stormwater drainage pattern is privately owned, yet only a very small percentage of this land is improved for stormwater treatment. Small scale improvements such as rain barrels, rain gardens, tree planting, downspout disconnections, and trash management would help improve the water quality of stormwater run-off significantly. The City could develop programs to inform and educate residents about conservation techniques to curb water use for purposes like landscaping, clothes and car washing, and bathing to help promote more sustainable behavior. Seemingly minor choices made everyday can culminate into substantial water savings.

Another example would be for the City to work with community leaders and key partners on promoting the environmental, social and economic benefits of the urban forest. The core of this initiative should be to clearly articulate the value of the urban assets. This includes fostering collaboration, information sharing and program development among sister agencies, nonprofits, businesses and community-based organizations throughout the City. At all ages, new generations of stewards need to be trained to help the City. Identifying all stakeholders and their respective motivations will allow targeted messaging and ensures everyone sees the value of maintaining and conserving the City's urban forest. Other strategies include:

- Publishing the inventories and research

conducted on the urban forest and initiating an urban forest media campaign that highlights tree planting, care and conservation events.

- Establishing site-specific tree planting standards and design specifications to be used by all agencies (e.g., allowing for variability of tree size, container type, species, tree form and recommended use);
- Engaging the green industry to promote best practices and standardize nursery production and planting practices;
- Prioritizing the placement of trees to maximize energy efficiency benefits;
- Ensuring planting locations have adequate soil and environmental conditions through performance based standards; and
- Increasing and reclaiming growing space (e.g., pavement reduction, setting aside vacant land, updating the City's Landscape Ordinance).

To overcome funding challenges, the City should investigate the multitude of resources to help quantify its tree canopy. I-Tree uses local data to statistically assess urban forest composition and its effects and values related to air pollution removal; CO₂ storage and sequestration; building energy use; and urban runoff, stream flow, and water quality. Software, training, and technical support are free.^{xxv} This tool helps communities measure, monitor, verify, and reduce GHG emissions through planned tree planting and

maintenance activities that increase the storage of CO₂ in trees.

Additionally, in terms of establishing an adaptation and resiliency strategy, first, the City must integrate these principles into its Asset Management and routine capital improvements planning process after an adaptation plan is developed. A critical step would be to adopt policies into the City's Comprehensive Plan and Code to address the need for this type of planning as well as principles to incorporate into land development decisions. Only through a fully integrated approach harmonizing long-term planning and short-term decision making will planning to protect the City's natural assets, and protect itself from the impacts of climate change, become a reality.



2

Energy Efficiency and Renewable Energy



Residential, Commercial & Public Energy and Industrial related emissions are 32.7% of the Community GHG Inventory or (973,389 MTCO_{2e})

Trends in CO₂ emissions from fossil fuel combustion are influenced by many long-term and short-term factors. Year in and year out, the overall demand for fossil fuels generally shifts in response to changes in general economic conditions, energy prices, weather, and the availability of non-fossil alternatives. Longer-term changes in energy consumption patterns, however, tend to be more a function of aggregate societal trends that affect the scale of consumption (e.g., population, number of cars, size of houses, and number of houses), the efficiency with which energy is used in equipment (e.g., cars, power plants, steel mills, and light bulbs), and social planning and consumer behavior (e.g., walking, bicycling, or telecommuting to work instead of driving).^{xxvi} Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity such as energy use for the electricity generation by utilities. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity. The

residential and commercial end-use sectors are reliant on electricity consumption for lighting, heating, air conditioning, and operating appliances and as such are indirect emissions sources. Direct emissions, used in industrial, commercial and residential sectors, represent the greatest share of U.S. GHG emissions.

The leading cause of industrial air pollution in the U.S. comes from electricity production and is responsible for about 40% of CO₂ emissions. The world's demand for electricity is expected to double between 2000 and 2030, with much of the demand coming from households. Natural resources used to produce energy are rapidly depleting, resulting in higher energy costs. Energy generated from green sources, such as wind, solar, hydraulic, geothermal or biomass have little to no air emissions. To reduce CO₂ emissions, alternative energy sources and new technology should be considered.

Energy use in homes and businesses is typically a large sector of GHG emissions. The U.S. Energy Information Administration ("EIA") indicates total energy use from these sectors at 7 % of electricity sales.¹⁹ In homes, several factors influence energy use: the physical characteristics of the housing units, the appliances utilized including space heating and cooling equipment, demographic characteristics of the household, the types of fuels used,

19. Electric Power Monthly, Table 5.1, April 22, 2009.

and other information that relates to energy use. According to the EIA, commercial buildings include all buildings in which at least half of the floor space is used for a purpose that is not residential, industrial, or agricultural; therefore, they include building types that might not traditionally be considered “commercial,” such as schools, correctional institutions, and buildings used for religious worship. This includes retail and wholesale stores, hotels and motels, restaurants, and hospitals. Excluded from the sector are the goods-producing industries: manufacturing, agriculture, mining, forestry and fisheries, and construction. Analysis of the structures, activities, and equipment associated with different types of buildings is the clearest way to evaluate commercial sector energy use. For the City, commercial emissions are 20.1% MTCO_{2e} and residential emissions are 11.9% MTCO_{2e} of the total communitywide emissions. For the purposes of clarification, this Focus Area does not include a discussion of specific building and energy efficiency approaches. That discussion is left to the Sustainable Building and Housing Focus Area.

In Florida, which consumes more electricity than almost any other state,^{xxvii} power production and consumption is responsible for 53% of Florida’s GHG emissions.^{xxviii} Fortunately, from the standpoint of emissions reductions, the energy sector also has the greatest potential for improvement.^{xxix} In considering measures to reduce emissions from the energy supply sector, the Governor’s Climate Action Team identified the three (3) most promising policy approaches to be promoting renewable energy, power plant efficiency improvements, and demand-side management of power consumption.^{xxx} The Action Team released Florida’s Energy and Climate Change Action Plan, concluding, among other things, that “now is the time for strategic investment in Florida’s low-carbon energy infrastructure”.

Florida operates under a traditional market structure in which electric utilities, regulated by the Public Service Commission (“PSC”), are granted franchise territories with the exclusive right to provide electric service.^{xxxi} Florida Power & Light (“FPL”), Gulf Power, Progress Energy, and Tampa Electric—and the public JEA supply over 80 percent of the electricity consumed in Florida. The rest of the state’s power is

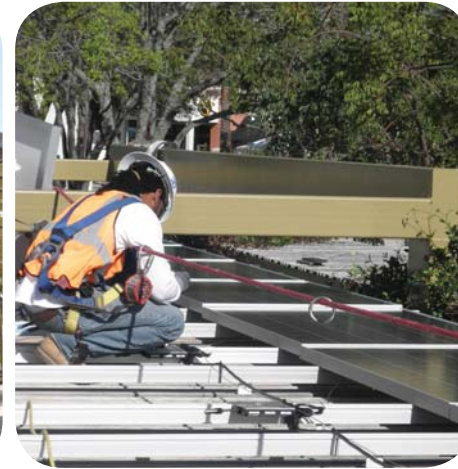


supplied mostly by municipal electric utilities or rural electric cooperatives.^{xxxii}

Florida’s energy planning framework is essentially utility-driven. Each year, the largest Florida utilities submit ten (10)-year power plant site plans that estimate “the utility’s power generating needs and the general location of its proposed power plant sites over the ten (10)-year planning horizon.” There are no formal constraints on utility choice in selecting the energy resource or general location for proposed power plants identified in the site plans. The PSC performs a preliminary review of the site plans and classifies them simply as “suitable” or “unsuitable” for planning purposes.^{xxxiii} In addition to “the need for electric system reliability and integrity . . . , the need for adequate electricity at a reasonable cost,” and “whether the proposed plant is the most cost-effective alternative available,” the PSC must now also consider “the need for fuel diversity and supply reliability” and “whether renewable energy sources and technologies, as well as conservation measures, are utilized to the extent reasonably available.”

Renewable Energy and Net Metering.

Debate continues over how significant the role for renewable energy can or should be. Renewable energy currently makes up less than 2% of the state’s generation capacity, but a recent assessment of these resources determined that solar, biomass, and offshore wind have the highest technical potential for Florida, given a 2020 planning horizon.^{xxxiv} Depending on the interplay of key economic and regulatory



factors, between 1800 and 16,000 MW of renewable capacity could be installed in the state by 2020, a range representing 6 to 27% of investor owned utilities' retail sales.^{xxxv}

The Legislature passed an energy bill in 2008 calling on the PSC to develop a renewable portfolio standard ("RPS"), a mechanism employed in many states to ensure that a fixed percentage of electricity is generated from renewable resources, but the Legislature failed to ratify the RPS during the 2009 Legislative Session. Pursuant to H.B. 7135,^{xxxvi} the state's investor owned utilities must compensate a customer who produces electricity over and above the amount supplied to them by the grid. To qualify, the electricity must be produced using a renewable energy system, such as a solar photovoltaic ("PV") system, up to 2 megawatts in capacity. The system must also be attached to the grid with a meter that is capable of calculating both electric usage and generation. Under existing law, if a renewable energy power system produces more electricity than the grid supplies during a monthly period, the excess is credited at the prevailing retail rate and carried forward for up to 12 months. Florida net metering requires that utilities reconcile this annually and issue payments to customers for any remaining net excess generation ("NEG") at the utility's avoided-cost rate (i.e., the rate at which it would have cost the utility to generate or purchase electricity during this period of time).

FPL Franchise Agreement.

On October 26, 1984, the City accepted a Franchise Agreement with FPL for the period of 30 years (until October 26, 2014) for the purpose of supplying electricity to the City. It gives FPL the right to utilize the City's rights-of-way for the purpose of providing electrical service. As part of the Franchise Agreement, the City agreed not to engage in the business of distributing and selling electricity during the life of the franchise or any extension to it in competition with FPL. Ordinance Number 1813-34 authorizes FPL to add a franchise fee (FF) to the electric bills in its municipality of homeowners and businesses and of its own government. FPL passes through the funds to the City collected from homeowners and businesses; it does not pass through the FF on the municipality's own electric bill. The City renewed its Franchise Agreement on June 27, 2011.

Demand Side Management Plan.^{xxxvii}

Pursuant to Rule 25, 17.0021, F.A.C., FPL is required to submit a Demand Side Management ("DSM") Plan to the PSC to reduce customer bill impacts and meet energy conservation goals. On March 25, 2011, FPL submitted an Alternative DSM Plan to the PSC which was later approved. The DSM Plan includes 18 existing programs and 8 new ones to achieve energy use reductions and



conservation. There are a wide variety of programs and measures included to address residential energy use, low income residential energy use and business commercial energy use. Some specific initiatives include:

- Residential Solar Water Heating – \$1,000 per installed solar water heater. FPL estimates rebates will be available for about 4,500 customers depending on the size of the systems installed.
- Business Solar Water Heating – Business customers will be eligible for a variable rebate based on the size of the system installed that will equal \$30 per 1,000 BTU/h/day of the maximum rated output of the installed system. The maximum incentive during the life of the program is \$50,000 per site. FPL estimates rebates will be available for about 50 customers depending on the size of the systems installed.
- Residential Solar PV – The residential solar PV program will provide an incentive of \$2,000 per kW of the rated direct-current (DC) output of a PV system up to a maximum of \$20,000. FPL estimates rebates will be available for about 400 customers depending on the size of the systems installed.
- Business Solar PV – The business PV program will provide a variable incentive depending on the output of the system. The rebate will be up to \$50,000 per site during the life of the

program and will be calculated as: \$2 per DC watt nameplate rating of the solar panel up to the first 10 kW; \$1.50 per DC watt nameplate rating of the solar panel from 10 kW up to 25 kW and \$1 per DC watt nameplate rating of the solar panel greater than 25 kW. FPL estimates rebates will be available for about 80 customers depending on the size of the systems installed.

While the City may not entirely control the power source and use citywide, efforts in this Focus Area must work in tandem with, and compliment, FPL’s initiatives. The SAP should be continually updated to incorporate information on the DSM Plan so that it can maximize energy reductions in all sectors. The City should also strive to develop new strategies with FPL to help implement the goals in this focus area.

Other Initiatives.

Combined heat and power (“CHP”) systems represent an efficient approach to generating power and thermal energy from a single fuel source such as natural gas. CHP systems provide onsite generation of electricity as well as waste-heat recovery that can be used for space conditioning (heating and cooling), hot water systems and other processes such as refrigeration and food processing. Such a system requires a large and steady demand for thermal energy in a central

Conventional Energy Generation Useful Energy 250 units

This building takes its electricity from one source and its heating/cooling from another resulting in 50% efficiency.

Useful Energy	250 units
Energy Wasted	250 units
Total Energy	500 units

Energy Input 500 units

Conventional Generation

- Energy Input 300 units

Energy Input

Useful Energy



Building

Electricity 100 units

Thermal 150 units

Energy Loss 200 units

Conventional Heating/Cooling

- Energy Input 200 units

Energy Loss 50 units

Energy Loss 250 units

CHP Co-Generation Useful Energy 425 units

This building uses CHP taking its electricity and heating/cooling from one source resulting in 80% efficiency.

Useful Energy	425 units
Energy Wasted	75 units
Total Energy	500 units

Energy Input 500 units

Energy Input

Useful Energy



Building

Electricity 70 units

Thermal 255 units

Energy Loss 75 units

CHP

location. CHP systems usually have an “anchor site” such as a hotel or industrial operation, and “client sites” that can use the excess thermal energy. They are typically powered by natural gas but have much lower emissions than traditional separate systems because of the higher efficiencies.

Implementation Strategy:

Path to Success:

One of the greatest challenges to success in this Focus Area is the inherent need for a strong and clear partnership with Florida Power and Light (“FPL”), the City’s energy provider. Another significant challenge is the fact that the deployment of renewable energy sources is controlled by state and federal regulations with the City having very little influence over the mix of power or speed with which renewable energy sources can be constructed. Within the City’s control is the ability to lead by example in utilizing renewable energy sources within its own facilities and operations and the ability to remove barriers (such as antiquated Code provisions) to increase renewable energy supply. Other challenges include: perceptions of inconvenience to change behavior, making the connection between energy conservation and cost savings, lack of awareness of incentives and continuity of incentives. Funding is also a challenge in this Focus Area since the City does not control the supply of power in the City. There are also challenges in regard to increasing renewable energy projects in relation to aesthetics and compatibility with surrounding buildings or land uses. Finally, while difficult to define energy use goals in the community, it is not impossible, and it will take feasible means to monitor results and track progress. The City can identify clear projects to coordinate with FPL upon such as increasing the marketing of their auditing and DSM initiatives. Another clear goal of this relationship should be to establish communitywide energy use or renewable energy goals so that the partnership can produce a tangible result against which progress can be measured. The City also has an opportunity to define and remove barriers to the goals above by highlighting its own progress

with regard to using renewable energy sources and making its own choices about energy use. The City can also facilitate other partnerships such as with Florida Public Utilities (“FPU”) to highlight cleaner energy incentive programs. Progress can be monitored with all available means such as website hits, participants in and workshops held, and information disseminated on incentives then utilized. Another partnership could supply a funding strategy for renewable energy and energy efficiency programs by exploring opportunities to “opt in” to existing initiatives. For instance, Palm Beach County has a revolving loan fund to supply financing to businesses that want to complete energy efficiency and renewable energy projects. Other programs are also developing in other local governments related to energy efficiency and renewable energy financing such as Property Assessed Clean Energy (“PACE”) or other financing strategies.

Several education and outreach strategies have been developed with a priority being placed on a widespread “Start Simple” campaign for energy efficiency in business and residences. Information about such a campaign can be publicized using City Public Service Announcements/Utility bills. Simple reminders to change air filters or inspect air ducts could comprise the “tip of the month”. It was clear that stakeholders felt that an increase in educational opportunities on energy efficiency and renewable energy should focus on lowest hanging fruit or “efficiency” measures first. One suggestion was made to create a multi-sector (geographic region or neighborhood/homeowner’s association) for an energy challenge to engage and motivate citizens, businesses,

and institutions that can help accomplish goals citywide. Another suggestion was made to highlight successful “do it yourself” case studies to market and convey the successes with: Neighborhood and Homeowner Associations, the Downtown Development Authority and the Website. The City itself should showcase new technologies at City facilities like the Library and City Hall. There was clear feedback to highlight and educate the community about opportunities with FPL’s DSM Program. This should include links to information, rebates, tax incentives and auditing services.

Finally, there were several suggestions to develop partnerships with trade schools and Palm Beach State College to “grow” the energy work force in the community. This would help meet skill and trade demands of new energy and renewable energy technologies. Any City Youth Programs should also integrate these components.



Goals for Energy Use and Renewable Energy

ER 1.0:	Diversify energy sources and build the energy economy.
ER 2.0:	Promote a “cultural shift” to save money and reduce carbon emissions.
ER 3.0:	Develop a “Best Practices” tool kit.
ER 4.0:	Highlight available and pending incentives for energy retrofitting and renewable energy deployment.

3

Land Use/ Transportation/ Redevelopment



The challenge of reducing GHG emissions from the transportation sector is a three-legged stool. One leg represents vehicle fuel efficiency; the second leg represents the fuel's carbon content; and the third leg represents the amount vehicles are driven, known as vehicle miles traveled ("VMT"). Since 1980, the number of miles Americans drive has grown three (3) times faster than the U.S. population, and almost twice as fast as vehicle registrations. Increases in gasoline prices moderate these trends to some degree. But given the difficulty in changing the factors that contribute to increasing VMT, such as low-density community design and people's decisions about where they want to live, it will take many years to reverse current trends.

The overall goal for the City is to establish a "sustainable transportation system" that is supported by sustainable land use patterns focused on redevelopment. The University of Plymouth Centre for Sustainable Transport provides a widely accepted definition of a sustainable transportation system stating, a sustainable transportation system is one that:

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations;
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy;

**Communitywide
transportation related
emissions are 27% of the
Community GHG Inventory
or (804,774 MTCO_{2e})**

- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

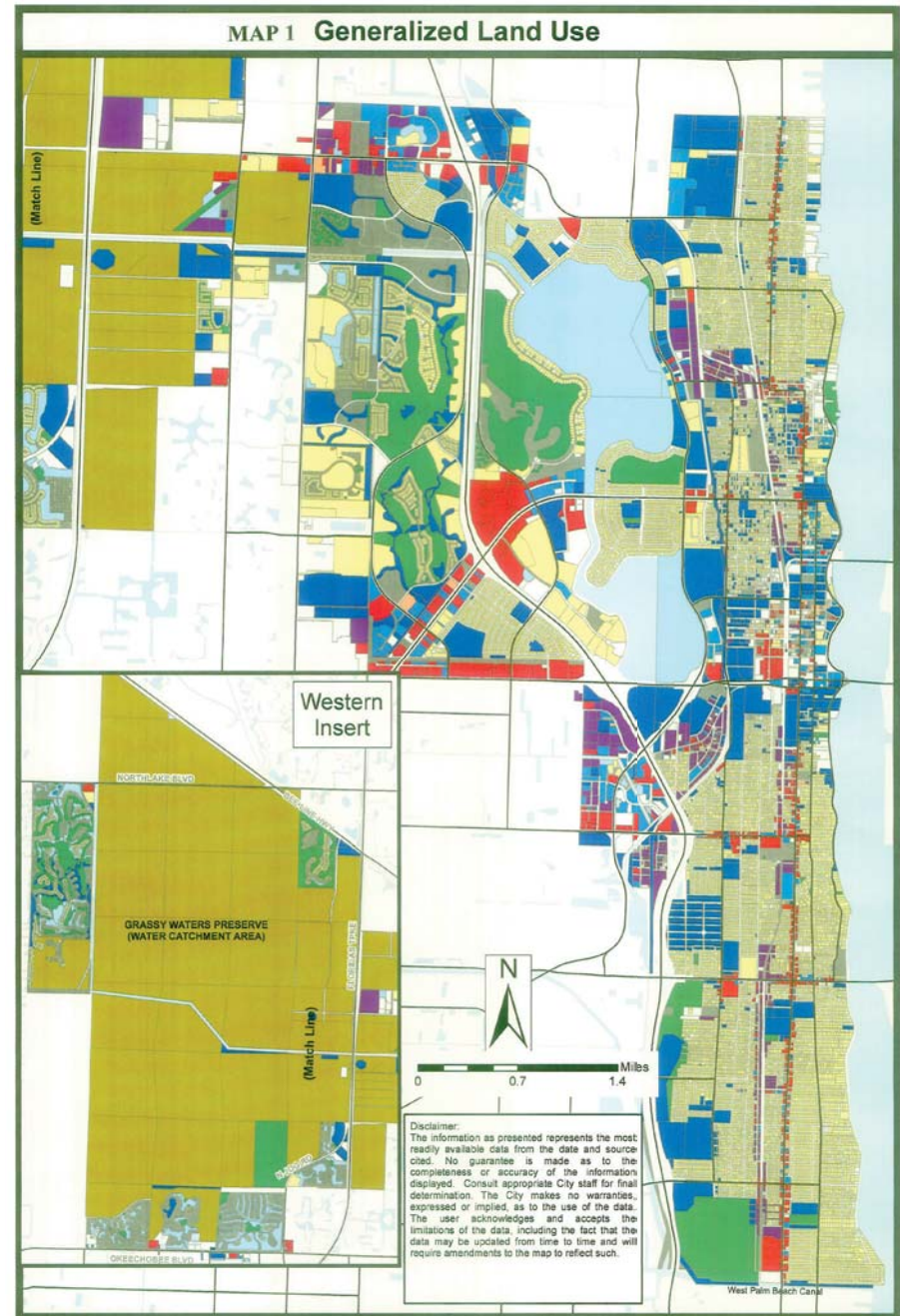
Reducing transportation emissions cannot be achieved by focusing on the transportation sector in isolation. Shifting the balance toward sustainable transportation modes requires a combination of policies, consumer education initiatives, sustained sources of revenue, and effective incentives. In essence, it requires assembling policies and programs that together will aggressively reduce VMT and the associated GHG emissions, while also improving community mobility and quality of life. An important consideration specific to transportation issues within Palm Beach County is the relationship between the County and the municipalities within its boundaries in terms of transportation planning. Pursuant to its charter, the County has retained regulatory power over a majority of the collector and arterial roads within the County. Therefore,

any large-scale effort to address reducing GHG emissions resulting in the development of roadways requires coordination with and cooperation from the County. The City and the County should coordinate on assuring policies are aligned to aggressively require, and plan for, the integration of multi-model transportation facilities in all major roadway construction and reconstruction projects.

Decisions made in land use planning directly impact patterns of travel between residential and employment and commercial centers. Sustainable land planning decisions directly correlate to reduced VMT and lessening GHG emissions. In Florida and in WPB specifically, the challenge facing sustainable land and transportation planning is the existing built-out environment. Out of approximately 37,000 acres only 700 acres are vacant, but developable, due to zoning and land use designations. Given the built landscape and the close relationship between sustainable land and transportation planning, the City has focused on these challenges together in one Focus Area.

Most traditional land use/transportation scenario planning efforts have focused on a limited range of land use and transportation investment scenarios, with analysis and evaluation leading to a preferred scenario. Next generation scenario planning efforts seek to capture a broader range of issues and challenges than previously considered such as alternative energy, technology advances, security, climate change, or economic shifts.

- Use of an enhanced traditional travel model can help address climate change impacts. Agencies can supplement traditional travel models to achieve more comprehensive GHG and air quality analysis.



City of West Palm Beach: Comprehensive Plan Map Series - Planning and Zoning Department
 Source(s): Property Appraiser Data File: EXISTING_LAND_USE091608 Date: September 16, 2008

- Development of meaningful indicators can help address livability. When analyzing scenario trade-offs, it is important to develop indicators that are meaningful to the community such as the use of metrics related to agreed-upon community values identified through a series of public workshops, such as gallons of gas consumed or percentage of population living in clustered communities. Other studies can be reviewed to develop a series of community indicators.
- Projection of financial impacts of development can help address financial stability. This information is valuable for stakeholders and elected officials to evaluate alternatives and is also critical for developing a feasible plan. For instance, typically, there are high roadway costs associated with low-density, trend development patterns, and that denser, mixed-use development would help control future transportation costs.
- Use of qualitative analysis. Use of qualitative analysis in scenario planning to address new trends can be a successful strategy, especially for agencies that want to spur dialogue about addressing emerging trends but have limited quantitative data and limited funding. This can be a useful tool for beginning to address new issues including fiscal difficulties, climate change impacts to the region, and “green job” development.^{xxxviii}

Transit service is an important strategy for improving transportation choice and providing basic mobility, particularly for non-drivers. Public transit can be used by anyone who pays the fare, although any particular transit service benefits some people more than others. For example, commuter rail improvements tend to benefit suburban residents, local bus service improvements tend to benefit urban residents, and special mobility services tend to benefit people with special transportation needs. Transit improvements (especially local bus service) tend to provide affordable mobility to low-income and transportation disadvantaged populations.



Figure 10: Trolley Route Map

The City has been operating a trolley service since 2000 between the Clematis Street District and CityPlace. In 2011, the trolley carried 686,000 passengers, an increase of more than 19% when compared to the previous year's ridership. The City was awarded a \$2 million Federal Transit Administration Capital Grant for the purchase of new trolleys to add new trolley routes or to supplement existing downtown routes. In early 2012, the City started service for a second trolley route that connects the Seaboard Train Station and new Intermodal Transit Facility with several of the Downtown's major transit generators and main employment nodes. During February of 2012, the first full month of operations of this new route, almost 10,000 passengers utilized the route. The Downtown Trolley Map depicts in yellow the trolley route that connects the Kravis Center and CityPlace with the Clematis Street District and in green the route connecting the Seaboard Train Station and new Intermodal Transit Facility with the rest of Downtown.

Regional transit service to the Downtown TCEA is provided by Tri-Rail, which is administered by the South Florida Regional Transit Authority (SFRTA). The City's Tri-Rail Station is located on Tamarind Avenue at Datura Street. In the last few years, Tri-Rail ridership has been just under 4 million passengers per year. The West Palm Beach station is one of the most heavily used within the entire Tri Rail system with the total number of annual boardings and alightings exceeding 600,000, making this station the 2nd most used in the entire system.

Transportation Demand Management ("TDM").

Transportation Demand Management is defined as a set of specific strategies that promote increased efficiency of the transportation systems and resources by promoting and providing a range of local or regional travel-related choices to influence individual travel behavior by mode, time, frequency, trip length, cost, or route. Mode choice or "modal split" can be defined as a method of dividing travel into all available transportation modes and can refer to the number of modes, number of trips or number of miles traveled. At least some of these motivations must be addressed to encourage a change in habits. Strategies are designed to alter travel behavior

in order to minimize congestion and provide viable and convenient transportation alternatives to driving alone. TDM measures include land-use management strategies such as infill development, incentives, enhancing existing transportation options and mitigating congestion such as encouraging telecommuting. Transit service improvements support and are supported by most other TDM strategies.

In January 2002, a meeting of downtown WPB Stakeholders was held to discuss solutions for traffic congestion. City leaders, County leaders, representatives of the Florida Department of Transportation ("FDOT"), and the Downtown business community reached clear consensus that one effective solution to traffic would be to establish a Downtown WPB Transportation Management Initiative ("TMI"). The City and the FDOT executed an agreement in 2002 to jointly fund the TMI. South Florida Commuter Services ("SFCS"), the regional commuter assistance program of FDOT, was contracted to implement the TMI. In June 2002, a full time Program Coordinator was hired and the TMI started operations. The TMI is a public/private initiative that provides transportation assistance to employers, commuters, and the Downtown business community. In addition, it serves as a forum for coordinating public and private efforts relating to transportation issues.

The purpose of the TMI is to address downtown WPB traffic congestion and parking demand by encouraging and promoting alternatives to driving alone in the downtown. As an effort to reduce the amount of motor vehicle traffic in the Downtown, the TMI's goal is to encourage commuter activities, such as carpooling, vanpooling, and transit use by promoting and marketing commuter options to the business community in the Downtown.

TMI GHG Emissions Reductions:

The TMI enhances the City's efforts to reduce emissions by measuring direct savings through registered alternative mode users. A snapshot of TMI alternative mode statistics as of December of 2011 is shown

Table 5.
Employer Outreach:

The TMI focuses on outreach to major employers located within the City. TMI efforts concentrate on major employers and office. The goal of employer outreach is to provide TMI education about alternative modes and other programs to reduce vehicle trips. Currently there are 383 employers in the SFCS database. Specific outreach activities included transportation days, employee transportation surveys, ride matching, Emergency Ride Home enrollments, new vanpools, CO₂ reduction promotions, preferential carpool parking, bicycle month promotion and survey follow up alternative mode promotions such as try transit, preferential parking introduction and point of sale transportation kiosk and

brochure displays.
New Programs:

- **Bike Parking Program.** Bike racks and lockers purchased in agency partnership. The City's Public Works Department, with the direction of the City's Transportation Planner, installed 43 bike racks throughout the City and Northwood Village. Bike lockers were installed in the City Banyan parking garage. The TMI worked with the City Parking Department to coordinate the bike locker registration process. The TMI created bike locker promotional flyers in English and Spanish.
- **Ride and Play Program.** The TMI created the Ride and Play program offering bicyclists discounts to various
- **Alternative Mode Destination Brochure.** The TMI created a "Getting Around West Palm Beach" six (6) panel brochure demonstrating how to get



downtown businesses. To promote the program, a separate webpage was created on the TMI website along with a rack card, business solicitation letter and a participating business decal.

	# in TMI Database (Total)	Drive Alone	Carpool	Vanpool	PalmTran	Tri-Rail	Other
WPB TCEA Area	624	411	131	6	51	22	3
WPB TMI Area	1,255	661	180	278	90	44	2
Total	1,879	1,072	311	284	141	66	5
# of Employers in Database		*CO ₂ Savings per Year (alternative mode users)					
WPB TCEA	115	TCEA = (213 commuters) - 1,455,384 lbs. of CO ₂ savings/yr					
WPB TMI	268	WPBTMI = (594 commuters) - 5,619,715 lbs. of CO ₂ savings/yr					
CO ₂ calculations based on 1 mile = 0.73 lbs. of CO ₂ output Average Daily Roundtrip Commute = TCEA - 40 miles / TMI - 53 miles							

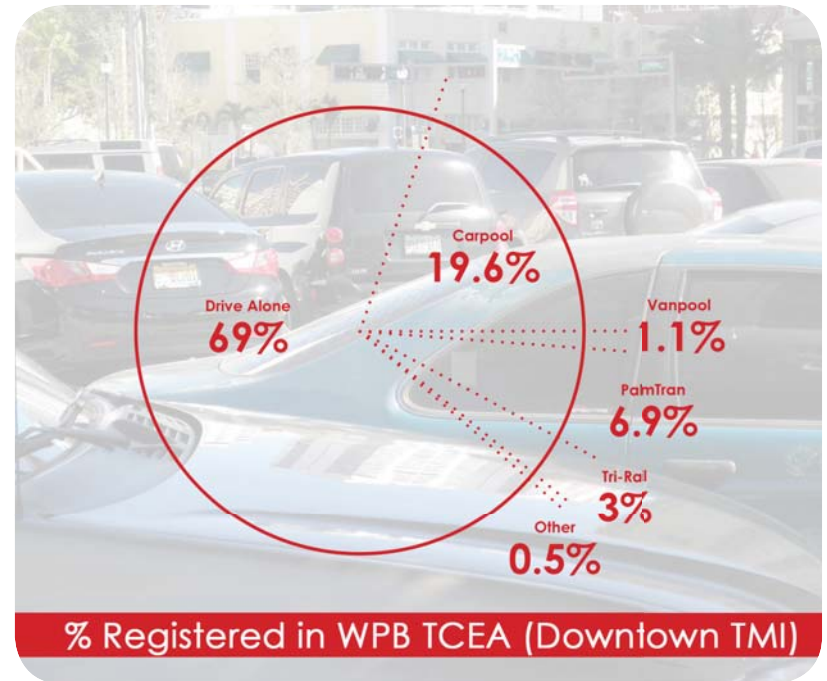
Transportation Concurrency Exception Area (TCEA) is an urban area delineated by a local government where infill and redevelopment are encouraged, and where exceptions to the transportation concurrency requirement are made, providing that alternative modes of transportation, land use mixes, urban design, connectivity, and funding are addressed.

Table 5: GHG Emissions reductions from TMI for 2011.

around the city using an alternative transportation mode. The brochure highlights city events, activities and destinations and folds out to an 11" x 17" map delineating trolley, Palm Tran, Tri-Rail and bike parking locations.

- Carpool Parking Program. To encourage carpooling and reduce GHG emissions, the TMI along with the City Parking Director, created a carpool parking program for three (3) city parking garages. The TMI has supplied the city with carpool parking signs and program logistics and implementation guidelines.

Capitalizing on the City's TMI, existing network, targeting improvements, and redeveloping in a transit-orientated fashion will allow WPB to meet the transportation needs of residents in a sustainable way. This will also position WPB to attract new residents by meeting the needs and desires of current and future residents who are attracted to walkable, car-free communities that have a mix of housing types and character. Housing values in transit-rich areas such as in the City are typically more stable than in the outlying areas



CARPOOL PARKING ONLY

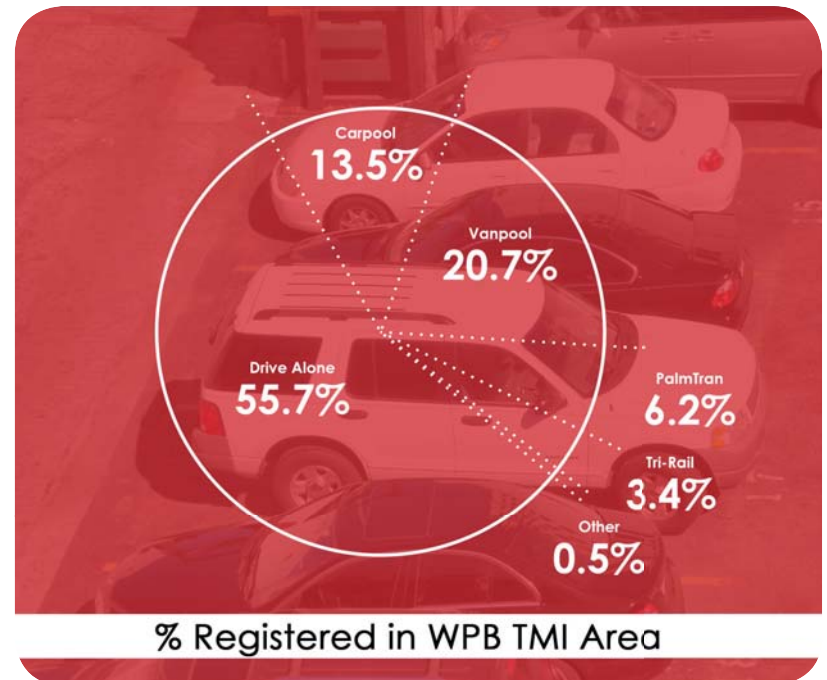
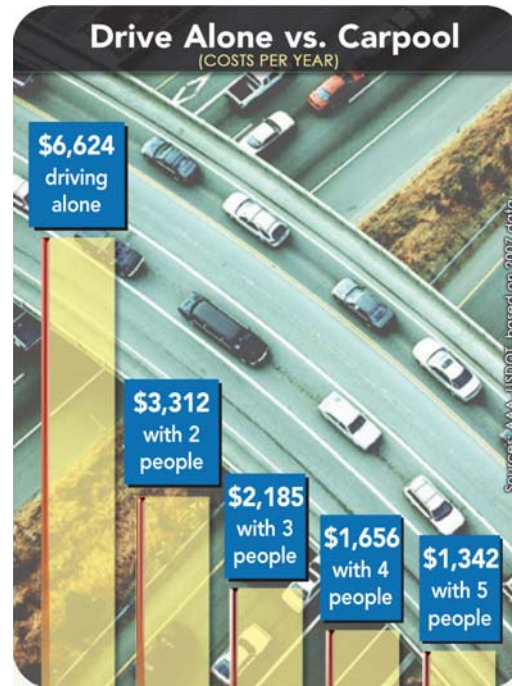
**PERMIT REQUIRED
VIOLATORS WILL BE TICKETED**



FOR MORE INFORMATION CONTACT:
1-800-234-RIDE
www.wpbmti.org









Miles **SAVED** by South Florida Commuters Choosing Alternative Modes Since January 1st.

5 8 8 9 1 4 2 2

Total **REDUCTION** of Greenhouse Gases (in **POUNDS**) by carpooling since January 1st.

4 9 0 7 6 1 8 . 5

of the region.

Transportation System Management.

Transportation System Management ("TSM") strategies include measures designed to enhance the efficiency and safety of the intermodal transportation network, to minimize congestion on existing facilities and to improve the air quality of the region. Strategies include new, modified or expanded infrastructure such as roadways, transit or bicycle facilities, widened sidewalks, improved traffic signalization schemes, enhanced transit service and reserved lanes for high-occupancy vehicles and/or hybrid vehicles. TSM initiatives serve to create a cooperative environment with all modes of transportation infrastructure that supports and encourages walking and cycling, calms traffic and leads to reductions in traffic injury and death. The provision of a comfortable, safe and attractive network for sidewalks and bicycle paths, as well as the provision of bicycle lanes, is also a focus of the City, in cooperation with its planning partners at the Metropolitan Planning Organization ("MPO") and

the County. MPO has recently adopted a County-wide study of the existing network and the City is poised to undertake its own bike/pedestrian/ greenway planning process.

In WPB, TSM activities attempt to reduce motor vehicle use in congested areas, such as the Downtown. This relates to the supply and demand of transportation facilities and related infrastructure, such as the cost of parking, the supply of parking facilities, bicycle/pedestrian facilities, and transit service and infrastructure. The City is continually improving the pedestrian environment within the Downtown. The Dixie Highway/Olive Avenue Downtown Street Master Plan, developed for the reconstruction of these streets, included a minimum sidewalk width of eight (8) feet. The plan also incorporated raised intersections at major pedestrian intersections, an increase in street trees, a greater separation between the sidewalk and the motor vehicle travel lanes, wider sidewalks, and on-street parking. The reconstruction of Dixie Highway and Olive Avenue that was completed in 2006 is an example where these principles have been incorporated. Also, the City has obtained several grants for streetscape improvements along Quadrille Avenue and Clematis Street that will create a safer and more pleasant pedestrian environment along these roadways. In addition, the City recently completed a series of significant improvements to Flagler Drive and its downtown waterfront area, which among other things have substantially enhanced the pedestrian environment on this area of downtown.



Generally, parking policy is also an important component of TSM. Low-scale buildings that are set far back from the street and surrounded by parking create a suburban auto-oriented environment. Rather, parking that is provided in the rear or under the building, separated

from the pedestrian realm makes the place easily accessible for all users. Complete street policies may reduce available on-street parking to accommodate improved bicycle and transit facilities. Increased walking, bicycling, and transit trips may also reduce vehicular parking demand while increasing demand for bicycle parking facilities. Curbside parking may be retained due to its traffic calming effects. Parking pricing policy also can help, such as variable rate parking and coordinated on and off-street parking.

The Downtown Master Plan (“DMP”), updated in 2008/09, has established minimum and maximum parking requirements for developments within the Downtown area in order to avoid excessive parking that could incentivize automobile use. For retail uses, the regulations consist of a maximum of four (4) parking spaces and a minimum of two (2) spaces per 1,000 square feet. For office uses, the requirements are a maximum of four (4) parking spaces and a minimum of two and a half (2 ½) spaces per 1,000 square feet. For residential, there is a maximum of two (2) parking spaces and a minimum of one (1) parking space per dwelling unit. The intent of the DMP is to reduce not only the amount of surface parking lots within the Downtown, but also to centralize the supply of parking, creating a “park once” environment that contributes to the reduction of motor vehicle use in the Downtown. The downtown regulations recognize the unique opportunities and

challenges of sustaining a truly mixed-use urban core. As such, the proposed zoning includes several allowances related to supporting transit, transportation options, and pedestrian activity. Among these are:

- Support of mixed-use development in urban core and special districts;
- Increased requirements for bicycle racks and showers and changing rooms for large developments;
- Sidewalk widths increased from eight (8) feet to 12 or 16 feet, depending on street designation;
- Requirement for ground floor uses which promote pedestrian movement, and architectural guidelines which create interesting storefronts;
- Minimum and maximum parking requirements to reduce dependence on single-occupancy vehicles;

- Incentives for affordable housing developments that will additionally help to preserve the residential/commercial mix required by the transportation concurrency exception area (“TCEA”); and
- Incentives for office development to provide increased employment opportunities in the downtown area.

One of the requirements of the TCEA was for the City to increase the ratio of residential to non-residential land uses within its Downtown. Baseline ratios of residential to non-residential ratios were established with specific timeframes for those ratios to be achieved. The logic behind these requirements was that new housing would bring more people into the Downtown, where many would work, shortening trips and contributing to the reduction of motor



An example of success is the free trolley operating in the primary downtown area. The route connects CityPlace to the Clematis District. Starting in 1998, ridership is near record numbers, where the period between January and June 2009 saw nearly a 50% increase. In 2011, the system carried 686,000 passengers with stops at governmental, shopping, entertainment and residential sites. New routes have been implemented in 2012 that will form the backbone of an expansion for the trolley service over the next several years. The program won a “2010 Best Book” Award from the Florida Redevelopment Association for Transportation Transit Enhancements.

vehicle use. Since the inception of the TCEA in 1997, several thousand residential units have been built within the boundaries of the Downtown TCEA.

Design for Complete and Green Streets.

Good design is an essential element of any urban environment. Many elements of street design, construction, and operation can work in favor of achieving both complete streets that work for all travelers and ‘green’ streets that serve environmental sustainability. Of particular concern are drainage and stormwater runoff issues too common in traditional streets. “Complete streets”^{xxxix} and public transportation are integrally linked. Streets designed with all users in mind help connect transit to destinations – work, stores, school, and home. Every transit trip requires crossing the street at least once, and a complete streets policy ensures those streets have safe crossings and accessible sidewalks to get passengers, regardless of ability, from the bus or train to where they need to go. The design takes into account placement of transit stops, bicycle infrastructure, and benches as well as transitions from one mode of transportation to another. It also incorporates a number of design and traffic-calming features, including raised medians, pedestrian islands, and curb extensions. Complete streets help to improve safety, build community, and address climate change through VMT reductions. Instituting



a complete streets policy ensures that agencies routinely design and operate the entire right of way to enable safe access for all users. The National Complete Streets Coalition recommends the following ten (10) elements of a comprehensive complete streets policy:

- Includes a vision for how and why the community wants to complete its streets.
- Specifies that ‘all users’ includes pedestrians, bicyclists and transit passengers of all ages and abilities, as well as trucks, buses and automobiles.
- Encourages street connectivity and aims to create a comprehensive, integrated, connected network for all modes.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the

entire right of way.

- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Directs the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs.
- Directs that complete streets solutions will complement the context of the community.
- Establishes performance standards with measurable outcomes.
- Includes specific next steps for implementation of the policy.

“Green streets” incorporate principles such as landscaping, historic character elements, traffic calming, and other unique features to distinguish from other street types. A Green street is a street right-of-way that, through a variety of design and operational treatments, gives priority to pedestrian circulation and open space over other transportation uses. The treatments may include sidewalk widening, landscaping, traffic calming, and other pedestrian-oriented features. The purpose of a Green street is to enhance and expand public open space, and to reinforce desired land use and transportation patterns on appropriate City street rights-of-way. Pedestrian-scale design is targeted at an increase in pedestrian travel with a corollary decrease in automobile travel. Because the very objective of designing at a pedestrian scale is to attract pedestrians, such

design has very significant traffic benefits. Pedestrian-scale design also increases the mode share of transit. The reason for this is that every transit rider is a pedestrian at the beginning and end of his trip. Therefore, improvements to the pedestrian environment at these locations will increase the attractiveness of using transit. In pedestrian-scale developments, there are usually no (or very small) setbacks, with each building right up to the sidewalk. This is the optimal condition for pedestrians because the distance between the storefronts and the main walking corridor is minimized. Pedestrian-scale refers to development that is built to be viewed and accessed by people traveling at very low speeds, i.e., on foot. Generally, buildings are small (or have varied facades) and close together, meaning that the pedestrian’s view is constantly changing. Moreover, pedestrian-scale development is more clustered than automobile-scale development, so more buildings are accessible within a given walking distance. So the overall effect of pedestrian-scale design on travel patterns is that traffic is lighter, slower, and more



acceptable for areas of high pedestrian and bicycle activity. The creation of a good pedestrian environment can generate a “park-once” environment, meaning that patrons to local establishments have the propensity to park once and subsequently walk between all their destinations. The impacts on overall parking requirements are profound.

Well-designed signs and information have a positive impact on the city— through increased comfort and awareness on the part of the user, and increased visibility for attractions and local businesses. Likewise, disorganized and uncoordinated signs serve to detract from their environment, leading to sign clutter and potential confusion for visitors and residents. Wayfinding is an experience: that of an individual attempting to make their way through an unfamiliar environment. When the information needed to access that environment is provided in a thoughtful, structured fashion, the unfamiliar quickly becomes comfortable, friendly, welcoming. A successful wayfinding system manages this experience, using signage as a communication tool not only to facilitate access, but also to reflect the civic culture and complement the environment of its setting. The benefits are tremendous and can have an obvious impact on reducing GHG emissions related to transportation:

- Directs cars to garages, eliminates circling to look for parking or destination

- Promotes walking, biking, mass transit
- Reduces driver confusion
- Establishes a comprehensive multi-layer strategy to improve pedestrian/vehicular wayfinding to amenities such as shops, hotels, restaurants
- Addresses parking/traffic issues by directing cars quickly into garages and getting people out/oriented to enjoy city shops and restaurants
- Can be used to provide pre-trip visitor information
- Provides a more comfortable and informative visitor experience, another reason to return

Transit-Oriented Development.

Finally, transit-oriented development ("TOD"), promotes denser, mixed-use developments in walking distance of transit,

and complete streets, which are safe and accessible to all users, can go a long way toward reducing dependence on the personal automobile and, thus, VMT and overall GHG emissions. A large and growing body of evidence shows that living near transit is the single largest influence on VMT.^{xi} Overall, the evidence shows that people who live near transit drive between 20% and 40% less. The City's TOD district is generally bounded by Clematis to the north, Sapodilla to the east, Fern to the south, and Clearwater to the west.

Past regional development patterns and infrastructure decisions have created a system where the most convenient way to travel is by single occupancy vehicle. Changing the existing physical infrastructure and citizen behavior patterns will be difficult. The City's core was designed

before the prevalence of automobiles, and at other points in history, relied on transit and walking as the principle means to move people around the city. Our land use patterns are dense and well distributed with ample sidewalks. The high density of residences combined with even distribution of commercial services supports high quality transit services. Many trips WPB citizens make are short enough for walking or biking. While walking and biking are the most efficient modes for short or limited distance trips, public transit remains a central component of a sustainable city.

Locating compact residential development and neighborhood-serving retail development along the same transit corridors represents an integrated strategy for reducing VMT and increasing other mobility options. Affordable housing in WPB's



most transit-accessible corridors has the potential to provide low income households with convenient access to transportation and other services without having to own a car.

A bicycle route network including both on road facilities and trails must be developed. This should include proper planning, design, signage, educational outreach, end of trip facilities (parking/showers) and a budget for maintenance. Currently, narrow, uneven sidewalks present a hazard to pedestrians, especially those with limited mobility. Ensuring that storm drain grates are bicycle “friendly” will improve cyclist safety.

Transportation Rating Systems.

There are also rating systems that include criteria to determine scoring for a transportation project’s level of sustainability.^{xii} These can greatly assist in

20. Greenroads is a sustainability rating system for roadway design and construction. It is applicable to all roadway projects including new, reconstruction and rehabilitation (even overlays) and bridges. Greenroads is a collection of sustainability best practices, called “credits,” that relate to roadway design and construction. Achieving these credits can earn points toward a total score for the project, and in general, this score can be used as an indicator of sustainability for the roadway. Four (4) different certification levels (rating) are available depending upon total score on a voluntary basis. The more points the higher the certification level. In 4 years of development, Greenroads has been tested on over fifty (50) design and construction projects, of various types, shapes, sizes and stages of design and construction. This type of system can evaluate two proposals using a common point system to determine their relative impact. The system, or one like it, also provides market recognition for sustainability efforts.

evaluating the design of a transportation project. Rating systems can help increase awareness of sustainability efforts and gives recognition to those who participated in the effort. Other rating systems exist for assessing the “sustainability quotient” of a transportation system. Benefits include the ability to link sustainability factors with decision-making, and promote more sustainable design and construction.^{20 xlii} The City could chose to utilize a rating system that maximizes all design priorities and compare proposed projects against a set of established criteria that can be adopted into the land development regulations.



Source: WPB Downtown Development Authority



Implementation Strategy:

Path to Success:

There are several obstacles to reduce GHG emissions in a City in this Focus Area. First, it is a primary source of emissions (here 27%) of the City's GHG emissions. It is difficult to tackle because of land use and zoning decisions made long ago that facilitate single occupancy travel and the most convenient way to travel. There are also perception issues associated with use public transportation in terms of costs, schedules and accessibility. Automobile use is obviously related to a variety of advantages such as on demand mobility, comfort, status, speed, and convenience.

Traditionally, increases in transit use coincide with the price of gasoline but recently there are other signs that drivers are beginning to change their driving habits, including buying smaller vehicles. The supply of infrastructure (like parking) has often not been able to keep up with the growth of mobility. Since vehicles spend the majority of the time parked, motorization has expanded the demand for parking space, which has created space consumption problems particularly in central areas. The spatial imprint of parked vehicles is significant. Many public transit systems are under used. Low ridership makes many services financially unsustainable, particularly in suburban

areas. Difficulties for pedestrians include intense traffic, where the mobility of pedestrians and vehicles is impaired or a blatant lack of consideration for pedestrians in the physical design of facilities. A lack of shared vision between various transportation related entities is a very large obstacle. Typically the paradigm with the limited funds that go to transportation projects is to spend those dollars on building roads not transit. A key program to watch for funding opportunities is the recent Safe and Complete Streets Act of 2011 (HR 1780) which could direct states to adopt policies related to complete streets as well as potential funding incentives for projects in states where such policies have been adopted.

Conceptually there are several strategies to combat these challenges. More connectivity between modes of transit is always a potential solution. This will require improved collaboration between all stakeholders, City government, neighboring jurisdictions, the MPO, Palm Beach County and other partners who can help make this a reality. Prioritizing the placement of amenities (bike racks, shelters, electric plug-ins) is an excellent way to encourage alternative modes of transportation because the facilities themselves demonstrate the accessibility to transit options. Any successful approach in this Focus Area will have to start with examining the current policy infrastructure for its ability to reach sustainability goals and provide incentives for infill and disincentives for sprawl to achieve the connection between

Goals for Land Use/Transportation/Redevelopment

LU 1.0:	Make cycling, walking, public transit, and other sustainable mobility modes the mainstream.
LU 2.0:	Encourage and incentivize land uses and density to facilitate development and redevelopment opportunities linked to transit.
LU 3.0:	Accelerate implementation of the City's Bicycle and Pedestrian Plans and continue efforts to make walking and cycling safe, healthy, and enjoyable alternatives to driving.
LU 4.0:	Manage parking effectively to minimize driving demand and encourage and support alternatives to driving.
LU 5.0:	Create incentives for low-carbon vehicles such as electric vehicles and plug-in hybrids and make transit infrastructure energy efficient.
LU 6.0:	Create sustainable design standards for transportation projects and systems.

transportation and land use. Flexibility to provide bicycle and pedestrian infrastructure in conjunction with roadway construction and reconstruction projects should be limited to the constraints of the facilities from land area, safety or right-of-way constraints. Not requiring such facilities should be based on substantial justification. Implementation of the goals in this Focus Area must occur through the Comprehensive Plan as a guide for sustainable decision-making but the land development regulations must support that Plan for predictability, certainty, and enforcement. Identifying and working with the major employers in the City is another good partnership. A successful strategy will include:

- Developing measures to monitor the quality of transit service to ensure that residents have access to high quality transit, especially in areas with low-vehicle ownership. The analysis can include measures related to capacity and quality of service for monitoring and tracking.
- Organize transportation advocates and government leaders to develop a unified voice to advocate for transit funding at all levels.
- Identify and expand the incentives that work to support more sustainable transportation options.
- Work w/media to change perception and educate people on the benefits of sustainable transportation options.

Education and outreach should center on promotion of business participation which can be accomplished in partnership with the Chamber of Commerce of the Palm Beaches. Intergovernmental coordination on transit and level of service or performance standards will also be critical. Continued coordination on the TMI strategies is a cornerstone given that WPB is fortunate to have this Initiative in place. Recognition to private partners is important to empower the business community. Finally, promoting walking, bicycling, and exercising by temporarily closing select streets to automobiles and creating “an auto-free space” for public interaction and use has been an education technique used in Portland, New York City, Chicago, El Paso, and Miami.



Source: WPB Community Redevelopment Authority

4

Sustainable Buildings and Housing



Year House Built	Total Housing Units
Built 2005 or later	2,149
Built 2000 to 2004	7,207
Built 1990 to 1999	6,251
Built 1980 to 1989	9,184
Built 1970 to 1979	7,350
Built 1960 to 1969	4,925
Built 1950 to 1959	4,469
Built 1940 to 1949	2,319
Built 1939 or earlier	4,234
Total Units Built	48,088

Table 6:
City of West Palm Beach Housing Stock
 Source: 2006–2008 American Community Survey
 Estimates for the City of West Palm Beach

According to the USGBC, the resource use of U.S. buildings includes 12% of the nation's water use, 39% of the CO₂ emissions, 65% of the waste output and 71% of the electricity consumed. For the City, commercial and residential GHG emissions constitute 32% of the communitywide footprint. Additionally, Americans spend close to 90% of their time indoors. Hazards found in indoor environments including lead, carbon monoxide, mold, allergens, radon, and second-hand smoke can pose a serious

threat to the health and productivity of building occupants. Effects can be especially detrimental to children. Areas with older building stock, like WPB, often face heightened risk of indoor contamination. Underserved communities are at particular risk.

WPB's Buildings and Housing.

WPB is densely developed, with a majority the housing built prior to 1989, [67.5%] of the total housing units. Single family housing units in WPB consist of only 44.7% of the total housing units. The overwhelming majority of housing units in the City are multi-family housing units which followed with 54% of the housing total. Many homes are drafty and have poor insulation and inefficient heating systems. While some homes have since been retrofitted with insulation, high-efficiency windows, new major appliances and systems, and other improvements, most existing homes have significant room for additional enhancements to reduce energy consumption. Cost effective energy improvements include sealing air leaks, insulating the attic and walls, upgrading lighting and appliances, and reducing losses from phantom energy loads (i.e., appliances and electronic devices that consume energy even when turned off). Many WPB businesses have considerable potential for energy (and money) savings through lighting upgrades, efficiency improvements made to heating, ventilating and air conditioning (HVAC) systems, and other measures.

Capturing these opportunities to save energy and money, as well as to garner valuable co-benefits such as job creation and improved building comfort, requires making existing services and standards more aggressive, providing a suite of energy saving tools and resources to residents, and finding ways to remove barriers to action. The efficient use of energy in homes and businesses saves money and minimizes GHG emissions.

Home weatherization is one of the most cost-effective ways to improve energy efficiency. Because more than 40% of WPB's housing units are rental properties, programs, either exist or must be developed, enable energy upgrades in this sector. But weatherization is also a workforce development strategy that creates demand for green jobs and an economic development strategy that increases the competitive position of WPB as a place to live and work. The City's housing agencies must therefore implement energy efficiency standards in any publicly-funded housing development project, aligning those standards up with federal and state criteria.

Energy Efficient Construction and Green Building.

The U.S. Energy Conservation and Production Act ("ECPA") requires that each state certify that it has a commercial building code that meets or exceeds ANSI/ASHRAE/IESNA Standard 90.1-1999. In this sense, "commercial" means all buildings that are not low-rise residential (three (3) stories or less above grade). This includes office, industrial, warehouse, school, religious, dormitories, and high-rise residential buildings. ASHRAE 90.1 is the most commonly used energy code for commercial and other non-residential buildings. The International Energy Conservation Code ("IECC"), previously the Model Energy Code ("MEC"), is the most commonly used residential energy code by states. The IECC also has a commercial section that allows the use of ASHRAE 90.1 for compliance. Florida has independently developed and adopted its own energy code. In 1980, the Florida Energy Efficiency Code for Building Construction ("FEECBC") was developed to be climate-specific for Florida. The 1998 Florida Legislature amended Chapter 553, Florida Statutes,



Building Construction Standards, to create a single state building code that is enforced by local governments. As of March 1, 2002, the Florida Building Codes supercedes all local building codes. Pursuant to Chapter 553, F.S. (the Florida Building Code) residential, commercial and renovated buildings "shall not be required to meet

standards more stringent than the provisions of the Florida Energy Efficiency Code for Building Construction". In 2008, HB 697 was passed requiring increases in the energy efficiency of the Florida Building Code: 20% percent in 2010, 30% in 2013, 40% in 2016 and by 50% in 2019. To meet the state's energy efficiency goals, the Florida Building Commission selected the most current version of the IECC as a foundation code; however, the IECC will be modified by the commission to maintain the efficiencies of the FEECBC.

Chapter 553, F.S. allows a "Technical Amendment" process to the Florida Building Code. The Florida Building Commission does not review or approve local amendments prior to adoption. The Florida Building Commission may issue non-binding advisory opinions relating to an amendment it has received and whether it is in compliance with the requirements. The Florida Building Commission reviews all local amendments when it conducts major updates to the FBC every three (3) years and may include local amendments in the new FBC or rescind them.²¹

The "green building" movement is about

21. Sections 553.904, F.S. (Thermal Efficiency Standards for new nonresidential buildings), 553.905, F.S. (new residential buildings), and 553.906, F.S. (renovated buildings) each contain language that all buildings "shall not be required to meet standards more stringent than the provisions of the Florida Energy Efficiency Code for Building Construction." This does not, however, prohibit "above-code" incentive-based programs.

constructing better buildings and more livable communities, not just protecting the environment. Green buildings conserve resources, save money on energy and water bills, provide a more comfortable and healthy environment for building occupants, and are proving to be more valuable than conventional buildings. The result is that these structures will use energy more efficiently and building owners save money. Consideration should be given to a range of policies and programs, including the use of financial incentives when appropriate. Green buildings have numerous energy reducing and economic benefits such as:

- Reducing the need for artificial lighting, HVAC by incorporating these components as "passive" taking advantage of the site for daylight and natural ventilation.
- Conserving water both inside and outside and often integrating innovative wastewater technologies such as gray water for irrigation.
- Reusing existing materials to the fullest extent possible and using new materials that minimize impacts on the environment, and minimize construction debris by recycling construction materials.
- Providing optimal air quality for building occupants over the lifetime of the building by eliminating materials that release volatile organic compounds and other toxic contaminants, and by providing proper ventilation.

- Enhancing the indoor environment for building occupants by considering lighting and air quality, thermal comfort and access to daylight and views.

Many of the current energy and water efficiency codes^{xiii} were not in place when WPB's homes and structures were built; therefore, many buildings do not meet current standards and operate in an inefficient and costly manner. Mandating efficiency improvements to bring buildings into compliance with current codes at the point of sale can help ensure that buyers are investing in a property that uses resources affordably and efficiently.

EcoArt Discussion.

EcoArt (ecological art) melds aspects of environmental art, activist art and community animation/mobilization art with engineering and science-originated



Source: Daryl McCann



Source: Dreher Park Eco Art

processes for restoration of damaged ecosystems. These projects engage and mobilize a community while employing, enhancing and melding techniques, knowledge and wisdom from landscape architecture, environmental biology and chemistry, planning and engineering and many other disciplines. Drawing from the deep roots of art history and the broadest lexicon of aesthetic methods and the support of a strong artist community, the

City is poised to use EcoArt concepts to feature sustainable design practices. There are two (2) municipalities which have included EcoArt in ordinances already including the City of Boynton Beach and the Town of Jupiter.^{xliv}

Existing Programs and Initiatives.

In 2009, the Housing and Community Development Department received \$4,349,546 for the Neighborhood Stabilization Program (“NSP”), as emergency assistance for the acquisition, rehabilitation and redevelopment of abandoned and foreclosed homes and non-residential properties. Properties acquired through the use of NSP funds will be rehabilitated or redeveloped and made available to eligible recipients as owner-occupants, tenants or with leases with an option to buy. Twenty-five percent (25%) of the available funds provide housing units that are affordable to individuals and families whose income does not exceed 50% of the area median




LandDesign.

MERRY PLACE

RPD MAJOR AMENDMENT - WEST PALM BEACH, FLORIDA

income. Seventy-five percent (75%) of the available funds, excluding administrative costs will provide housing units that are affordable to individuals and households whose income does not exceed 120% of the area median income. A primary purpose of the City’s NSP is to prevent neighborhoods from becoming blighted due to abandoned and boarded homes which has a destabilizing effect on a neighborhood.

The City also has Community Development Block Grant (“CDBG”), HOME Investment Partnership (“HOME”) and Housing Opportunities for Persons with AIDS (“HOPWA”) funds from the U.S. Department of Housing and Urban Development (“HUD”) and maintains a Housing Rehabilitation Program. The City will dedicate a percentage of its annual CDBG & HOME allocations to the priority need of increasing affordable housing. By rehabilitation of these homes, the current owners, many of whom are elderly, benefit from improved housing conditions and lower energy costs.



MerryPlace includes “Green Features” in every unit such as waste minimization and material recycling during the construction process, native landscaping, high efficiency drip irrigation, added building insulation, Energy Star appliances and fixtures, zero VOC paints and caulks, state of the art ventilation systems, moisture barriers, minimal use of carpeting, and an innovative resident education program that includes financial incentives for energy efficient living. From its inception, the planning and design of MerryPlace has been based upon innovation and creativity. The site plan was developed through a collaborative dialogue among City and CRA staff, Housing Authority staff, engaged neighbors and design consultants.

Incentivizing Sustainable Buildings and Construction.

When creating incentives, compliance with sustainability goals could be one basis of eligibility for various energy-related incentives and financing provided by City government. Another approach is to require improvements to a building’s energy performance when a building undergoes a major renovation, is sold, or is converted to a condominium. These events are also a good opportunity to conduct targeted outreach and education to residents. When developing incentives the City should work in conjunction with the local building community to determine what will make a meaningful impact to incentivize green

building projects. The City should also create a clear list of criteria to achieve these incentives. The City should also benchmark, track, and report on implementation progress at regular intervals. Various City Departments, divisions and special taxing authorities should collaborate to achieve green building success stories.

As the City works to improve the service it provides to those seeking building permits, it would be helpful to establish a “specialist” building inspector to assist with green building questions, provide upfront coordination and assistance for builders committed to achieving a high level of green building.

Another way to coordinate these initiatives would be to dovetail some of the programs the DDA currently has to incentivize relocation to the downtown. For instance, the DDA currently offers Large Project Incentive Grants up to \$100,000 (and Retail Loans, Business Expansion/Relocation or Special Project Incentive Grants for lesser amounts) for adaptive re-use bringing buildings up to code in terms of mechanical, plumbing and electrical to make space available for new leasing. One measure the DDA could implement would be to offer increased grants for certain types of retrofits that exceed energy or water efficiency standards or to encourage building rehabilitations to achieve above code certifications.

Linkages with Historic Preservation.

A very high priority strategy is to institute programs to help WPB’s existing building stock and representing a significant investment in embodied energy that went into making and transporting materials and erecting the structures. Many of the City’s older structures and homes also contain sustainable elements and designs that include the use of local materials, natural ventilation, and energy-efficiencies such as row house construction, which provides two-sided insulation by design. Through the preservation of vernacular construction, which utilizes traditional building forms, constructed by builders who used traditional building techniques, and locally available



construction materials the City can achieve these goals. Historic vernacular buildings in WPB reflect a local adaptation to the landscape and climate, incorporating efficient design choices, including floorplans to compliment Florida's weather. Examples include the use of deep roof eaves, porches and awnings for shade. Wood exterior finishes are a renewable resource and non-toxic to produce. "Recycling" older buildings by preserving and reusing them utilizes this embodied energy, builds on traditional sustainable practices, and reduces the amount of construction waste entering our landfills when buildings are demolished.

Additionally, The historic character of our communities attracts visitors and helps to sustain our economy. Careful stewardship of older homes and buildings helps to create a distinct sense of place, and learning about local history connects people to their community. It is a commonly held misperception that paying high energy



bills is the "cost of doing business" for historic property owners and caretakers. Modern technologies and weatherization procedures allow significant improvements to buildings without compromising the historic value of the structure. Preservation can also be an important climate protection strategy. With that said, it is important to strive for wholebuilding solutions that address each building's unique situation in an intelligent, cost-effective, and historically sensitive manner.^{xlv}

Implementation Strategy:

Path to Success:

With green building, there is a myth of high cost. Because most developers do not pay for the energy costs of the buildings they construct, they have little motivation to exceed base standards for energy-efficiency. Financial incentives have to encourage developers, existing commercial building and home owners to make



energy-saving investments. The creation of financing programs is another tool many local governments are employing to achieve targeted GHG reductions.

One significant barrier to achieving GHG reductions in rental residential buildings is what is referred to as the “owner/tenant split financial incentive.”^{xlvi} Building owners have little incentive to invest in energy or water efficiency improvements since any gains will primarily flow to the tenants who often pay the utility bill. Conversely, tenants have little incentive to invest in structural efficiency improvements when they do not own the building and their tenure in a unit is generally of shorter duration relative to the “pay-back” on the investment. In order to overcome the “split incentive” barrier, the City, community agencies and other stakeholders should begin a process to evaluate potential outreach efforts, incentive structures and mandatory requirements that enable both

the landlord and the tenant to benefit from building energy and water efficiency improvements.

The City must work with relevant agencies to establish additional incentives geared toward WPB’s local energy standards, i.e., designed to encourage a deeper, more comprehensive set of energy improvements. Such incentives could include providing property owners and tenants with rebates that could be applied to energy services provided by independent service providers. While helpful, the incentives funded through the FP&L Demand Side Management Plan are generally not structured to achieve the scale of savings sought under the SAP.

Better coordination across existing programs is highlighted in this Focus Area. For instance, CDBG, NSP, and other programs should all be coordinated to achieve the highest level of energy efficiency in

rehabilitations and new construction as possible. Eligible low-income homeowners are entitled to free home repair services such as plumbing, electrical and carpentry repairs; mobility and access installations (grab bars, hand rails, lifts, ramps, etc.); and fire safety measures. The DDA offers a Roof Weatherization Program to help property or business owners retrofit rooftops to provide more energy efficiency in the building envelope. The grants provide up to 30% of the cost of weatherizing building rooftops (up to \$5,000). The partnership includes the City and FP&L. The grant remains flexible on the Roof Weatherization project covering reflective roof coating, insulation or other technologies. At the federal level, HOPE VI^{xlvii} and Choice Neighborhoods could offer potential funding opportunities at the federal level, although as of the drafting of the SAP, 2011 funding levels were unknown.

Goals for Sustainable Buildings and Housing

SB 1.0:	Encourage innovative strategies that minimize energy and water consumption, maximize the recycling of construction debris, and provide for a more comfortable indoor environment.
SB 2.0:	Integrate housing and redevelopment programs to achieve common goals.
SB 3.0:	Realize cost-effective, wholebuilding solutions that reuse buildings, keep the historic fabric of buildings and structures intact and improve the energy performance of the building.
SB 4.0:	Simplify project review and permit approval process to encourage innovative green building measures.
SB 5.0:	Provide meaningful incentives to encourage green and energy efficient building practices.
SB 6.0:	Reduce dependence upon chemicals and unnatural substances in building and construction.



Source: South Florida Chapter - USGBC

Behavioral change underlies the success of each of the components outlined above. The City and its partners must combine efforts in the policy arena with targeted education and marketing for residents, businesses and institutions. Personal choice underlies many of the building energy use-related changes that will have to occur in order for the community to achieve its GHG-reduction goal. As such, enhancing and expanding current education and outreach efforts is fundamental to this plan. The City must market and educate the development community about green building approaches. Strategies include enhancing outreach to encourage developers to adopt national green building and energy performance standards, such as ENERGY STAR, FGBC and LEED. The City should also highlight existing green buildings and cutting edge green technologies through green building tours. An effective technique is to highlight existing

green buildings in the City through case studies made available at the City's Construction Services Office as well as City and partnering agency websites. The City can also expand the green building display in the Construction Services Office and utilize it to showcase innovative green building materials and practices. The City can also partner with the local Association of Realtors and other real estate professional groups in an effort to conduct targeted outreach and education to new City homeowners. The City can include building energy use-related education materials in a welcome package for all new homebuyers/renters, including available rebates and incentives for energy measures. Finally, the City can get neighborhoods and constituents involved in home energy efficiency and challenge them to reduce their household CO₂ footprint.

5

Waste Management and Recycling



Framing the Issues and Challenges.

In the past 50 years, the amount of MSW generated in the U.S. has nearly tripled. The collection, transportation and disposal of this waste presents a considerable cost to local government, poses threats to public and environmental health, and when landfilled, or incinerated, results in a permanent loss of valuable materials such as metals, glass, paper and organic matter. The amount of waste Americans create per person per day has nearly doubled since 1960. The total energy consumed related to waste management activities is a result of direct fuel and electricity consumption associated with raw material acquisition and manufacturing, fuel consumption for transportation, and embedded energy. The EPA Office of Solid Waste and Response concludes that 42% of U.S. 2006 GHG emissions were associated with the manufacturing, use and disposal of materials and products.^{xiviii} Approximately one-third of all the trash that is thrown away in the U.S. is packaging, and the average American consumes about 66 pounds of packaging each year.

Materials management describes how materials are managed as they flow through the economy from resource extraction to product design and manufacture, transport, use, reuse, recycling, and end of life. If consumers, institutions, and businesses understand the lifecycle of products and materials, they will be more likely to adopt

Solid waste related emissions are 40.2% of the Community GHG Inventory or (1,198,181 MTCO_{2e})

a set of best management practices which limit the amount of materials entering the waste stream. Source reduction prevents the generation of waste and pollution. In the materials management framework, it is the reduction of the amount of materials entering the supply stream. Reuse is the reuse of a product by its original user or someone else. Recycling is a series of activities that includes collecting recyclable materials that would otherwise be considered waste, sorting and processing into raw materials such as fibers, and manufacturing raw materials into new products. Disposal is the placement of waste on land or underground, including proper disposition of a discarded or discharged material.

Construction and Demolition Debris.

Construction and demolition debris (“C&D”) consists of materials that are generated from residential and commercial building, renovations and various types of demolition.^{xlix} C&D materials include wood, steel, glass, brick, concrete, asphalt, wallboard, rocks, soils, tree remains, trees and other vegetative matter. Only non-



Source: inhabitat.com

water soluble and non-hazardous materials are considered C&D. A large portion of C&D debris is recyclable—approximately 5% is metal, 9% is asphalt, brick or concrete and 30% is wood. Deconstruction is the systematic dismantling of a building that allows for the reuse and/or recycling of building materials. In addition to reducing the amount of waste entering landfills, deconstruction provides significant economic opportunities in the form of job training programs and support for local businesses that salvage and repurpose these materials. Recycling C&D waste not only keeps it from ending up in the landfill, but also reduces the upstream energy consumption required to manufacture new construction materials.

Organic Waste.

Organic waste materials include food waste, yard trash and paper. The EPA estimates that Americans throw away a quarter of the food we prepare, about 96



Source: Joseph Sohm/Corbis

billion pounds each year. In 2007, 12.5% of all MSW was food waste and less than 3% was recovered before going into the landfill. The methane produced in landfills, which contributes more per unit to global warming than CO₂, is the product of food decomposition. Composting results in some CO₂ storage (associated with application of compost to agricultural soils), as well as minimal CO₂ emissions from transportation and mechanical turning of the compost piles. Without proper disposal, Fats, Oils and Grease ("FOG") products enter the wastewater system creating problems in sewer lines, pump stations and ultimately the wastewater treatment process. When FOG is disposed of in the wastewater system, it cools, solidifies and adheres to distribution pipes and equipment. Eventually this can cause the system to backup, overflow or reduce the conveyance of materials through the system. Successful FOG management programs require facilities to either install and maintain grease interceptors or to assure pick up of spent products.



Source: Basel Action Network

E-Waste.

The proportion of electronics — such as televisions, computers, printers, cell phones, stereo equipment, VCR/DVD players and video game consoles — discarded into the waste stream is rising at a rate two-to-three times faster than any other waste segment. According to the U.S. EPA, 82% (1.84 million tons) of the 2.25 million tons of obsolete or unwanted electronics were landfilled in 2007. "E-waste," as it is often termed, presents numerous public and environmental health and safety concerns as discarded items often contain heavy metals that may be toxic (i.e. lead, mercury, cadmium) when released into the air, soil or water through landfills or incinerators. As rates of e-waste continue to rise, a number of states have passed legislation banning electronics from landfills entirely and/or requiring manufacturers to take back products at the end of use. Hundreds of local governments have also taken steps to increase consumer awareness about proper disposal, provide

e-waste collection services or resources and lead by example by requiring Environmentally Preferable Purchasing and recycling of city-owned electronics.

Waste Management in Florida and Palm Beach County.



The SWA provides solid waste disposal and recycling services and programs to the County's 1.4 million residents and businesses.ⁱ The SWA has interlocal agreements with their municipal partners to deliver its residential solid waste, recyclable materials, and commercial solid waste to facilities designated by the SWA. In 2006, SWA updated its comprehensive Integrated Solid Waste Management Plan ("ISWM Plan") with the

principal goals of reducing the amount of waste placed in landfills for disposal and the conservation of landfill space as a result of effective integrated solid waste management operations. Under the ISWM Plan, the SWA manages solid waste through a combination of techniques and programs which recognize that MSW is made up of distinct components that should be managed separately. The SWA implements the provisions of the ISWM Plan through an award-winning, integrated, MSW management system (the System) that combines recycling, composting, converting waste to energy through combustion, and landfilling to effectively manage the County's waste. The System implements the provisions of the ISWM Plan and integrates solid waste transportation, processing, recycling, resource recovery and disposal technologies while protecting the environment and achieving the SWA's current 50% recycling waste reduction goal. In addition to activities directly operated or contracted out by the City or SWA, several private refuse and recycling companies do business in the community. As previously discussed, the SWA will be opening of a new Waste To Energy ("WTE") facility, expected to be fully operational in 2015.

The modern era of recycling in Florida began with the Florida



Legislature's passage of the Solid Waste Management Act ("SWMA") of 1988, including a 30% recycling goal. The state's last recycling report found: Florida generates more than 32 million tons of municipal solid waste annually, almost two (2) tons per resident per year. As much as 12% of the 2020 recycling goal could be met by processing C&D debris at a 75% rate through materials recovery facilities, all at relatively low cost and with an income source in recovered materials. Organics (food waste, yard trash and paper) represent 40% of municipal solid waste and also must be recycled at dramatically higher rates to meet the 2020 goal. The commercial sector has a current recycling rate of 30% and generates 67% of MSW (twice the amount generated by the single-family residential sector.ⁱⁱ Commercial in this context includes multi-family residential units (apartments, condominiums, etc.) as well as institutional accounts (such as schools and hospitals). With needed increases in recycling rates, the markets for goods made with recycled content must also expand.ⁱⁱⁱ Twenty (20) years later, with a statewide recycling rate of only 28%, the Legislature reasserted the importance of recycling and established a new goal: 75% to be achieved by 2020.ⁱⁱⁱⁱ

Palm Beach County recycling rates in 2007 were 36% but calculated at 50% including C&D debris. The City's current Comprehensive Plan

goal is (Policy 1.2.1) as follows: The City shall continue operating its recycling program on a Citywide basis in order to increase the amount of recyclable material, to reduce solid waste going to landfills by 30% between 2008-2018, and to conserve valuable natural resources through reuse of materials. This is tied to the State's previous goal. Section 403.706(2)(a), F.S. was amended in 2010 to require the following:

Each county shall implement a recyclable materials recycling program that shall have a goal of recycling recyclable solid waste by 40% by December 31, 2012, 50% by December 31, 2014, 60% by December 31, 2016, 70% by December 31, 2018, and 75% by December 31, 2020. Counties and municipalities are encouraged to form cooperative arrangements for implementing recycling programs. (3) Each state agency, K-12 public school, public institution of higher learning, community college, and state university, including all buildings that are occupied by municipal, county, or state employees and entities occupying buildings managed by the Department of Management Services, must, at a minimum, annually report all recycled materials to the county using the department's designated reporting format.

The 75% recycling goal is a general statewide goal that currently places no direct responsibility on any particular level of government or any other entity. Because recycling programs are implemented at the local level, local government plays an even more important role than state government in reaching 75% recycling. With a phased approach to requiring commercial recycling, focusing first on office buildings, retail establishments and institutions; and second on multi-family residential units, DEP estimates these strategies will help achieve 31% of the State's 75% recycling goal.

Private companies have been expanding their partnerships with cities to offer consumers financial incentives based on the volume of waste recycled. A handful of entrepreneurial small businesses and municipal-led programs have also emerged to collect organic



waste as part of curbside compost programs. And while disposing of electronics has typically been an arduous affair (thus prompting improper disposal or stockpiling) large electronics suppliers have recently launched "buy-back" programs to encourage the proper collection and perhaps even reuse of items or component parts.

These strategies can also prevent unnecessary landfill buildup and reduce the need for new landfill creation. In addition to its environmental benefits, recycling makes good financial sense. Roughly half of all household trash can be recycled and therefore holds value. For example, recycling an aluminum can saves 95% of the energy required to make another from raw materials. While throwing away recyclable materials such as glass or plastic bottles costs taxpayers money in the form of tipping fees, recycling that same bottle can actually create a revenue stream for a local government. Waste management can be viewed from two distinct perspectives; either in terms of sanitation or of material recovery.

While we struggle with addressing GHG emissions resulting from the solid waste sector, litter and illegal dumping also affect our water quality. Storm drain systems designed to funnel rainfall and run-off into waterways can become blocked by litter and debris. With this run-off, come a number of pollutants, most prominently trash and chemical waste, which end up in lakes and ultimately the Intracoastal Waterway or GWP and other natural areas. Dirty and littered places, as a result of illegal dumping and improper waste disposal, can also indicate neighborhood decline. Perceptions of neighborhood neglect have real economic costs through decreased property values and investment.

Implementation Strategy:

Path to Success:

In the U.S., the range of waste management strategies varies considerably and depends on a number of factors including location of disposal and recycling facilities, funding and public or political support. Previous discussions related to a City Environmentally Preferable Purchasing policy address this issue for government operations, but the policy needs further traction among businesses in the community, in the region, and beyond. During the development of the SAP, several challenges, or perceptions, were discussed providing obstacles to successful waste management initiatives to reduce GHG emissions. These include:

- Convenience;
- Lack of public education and training for recycling;

- Little emphasis on organics (food, paper, yard trash) recycling and C&D recycling;
- Little emphasis on the broad commercial sector and multi-family units;
- Underutilization of incentive programs for the residential sector, such as Pay-As-You-Throw (“PAYT”) and RecycleBank; and
- Access for all sectors of the community.

In response to these challenges local governments have been developing innovative, cost-effective and responsible strategies to divert waste from landfills, recover and repurpose valuable and/or toxic materials, and even generate revenue and support local businesses. While many cities have implemented programs to divert yard waste from landfills, similar efforts to capture and compost food waste remain an underutilized cost saving and waste diversion opportunity. Recognizing the importance of reducing C&D waste in landfills, many cities have issued ordinances and set C&D reduction goals. PAYT programs have been successful in thousands of communities to increase diversion strategies such as recycling and composting.²²

Commercial-specific programs including recognition and marketing were suggested. Incentive programs for businesses such as tax credits and reduction of occupational license fees were discussed to increase commercial recycling rates. Another suggestion

²² Customers are charged for waste disposal based on the amount (by weight or unit) generated rather than a flat-fee. An incentive is therefore created for customers to reduce waste at the source (i.e. avoiding disposable products or excessive packaging) and reuse or recycle items.

Goals for Waste Management and Recycling

WM 1.0:	Enhance recycling, composting, and source reduction services for residential and non-residential buildings.
WM 2.0:	Create C&D recycling program that results in high levels of reused materials.
WM 3.0:	Make recycling and composting mandatory at public events and provide more public recycling containers.



was to improve the enforcement of the City's sanitation code by more vigorous monitoring, reducing response time on violation calls, and collecting higher penalty fines.

On the education and outreach side, the Florida Department of Education ("DOE") is already required to educate K-12 students in recycling by developing curriculum materials and resource guides for recycling awareness programs. Further feedback included the need to educate residents and businesses about proper trash storage and disposal. This needs to focus on a clear, concise, and consistent message about proper waste disposal in the City through a variety of outlets to all businesses, institutions, and individuals. This message must be available in multiple languages and locations so that it reaches all sections of the population.

Visible partnerships that already exist such as clean-up efforts can engage more communities and organizations and



increase the frequency and regularity of these opportunities. The City can sponsor neighborhood pitch-ins, park maintenance programs and community cleanups. The City can assist all businesses in WPB in making sustainable purchasing decisions by providing clear and adaptable information on how to purchase goods with less packaging and more potential to reuse or recycle materials. While examples of such policies and guidelines already exist, more can be done to promote and distribute these examples to area institutions and businesses. Finally, the City can establish an environmental leadership and recognition program to acknowledge commercial, residential, industrial and institutional champions for material recovery, reuse and recycling efforts. The City can partner with the Chamber of Commerce, and other business associations, to conduct expanded marketing and outreach to local business owners.



Source: Palm Beach County Schools



6

Growing a Green Economy



The Promise of a Green Economy.

It is now becoming imperative for governments to institute legislation and policies to encourage the greening of businesses. Resource scarcity, climate change and population growth pressures are compounding existing challenges to economic growth. But, addressing sustainability is not only a cause for environmentalists. Sustainability intersects with efforts to create employment opportunities in the emerging green economy. Unlike other types of environmental policies, energy efficiency and GHG reduction efforts can produce direct cost savings in government operations and for citizens as well as “co-benefits” by enhancing the performance of other local programs.^{lv} Sustainable communities have the ability to attract potential business investments, a skilled workforce, and new business opportunities that may be related to green and clean energy industries. Implementing the SAP will result in increased demand for skilled labor, such as that needed for energy efficiency retrofits, solar installations, processing of recyclables, growing and processing local food, and designing, building and maintaining infrastructure related to alternative transportation.

Because climate change and sustainability problems are increasingly recognized to require local action, and because green industry is projected to be one of the

fastest growing segments of the overall economy over the next few decades, economic development provides abundant opportunities for local governments and public sector firms to attract green industries and inject environmentally friendly considerations into land use decisions. Attracting green business is widely recognized as an important component of a community’s economic development strategy, but this potential has not yet been fully realized. Greening business will involve multiple stakeholders as well as the business community.^{lvi}

In the face of such opportunity, equipping WPB as a green business center makes good financial sense. “Green jobs” are jobs in business whose products and services directly improve environmental quality. Sometimes the term “green-collar job” is used to distinguish between a job that produces environmental benefits and one that does so while also ensuring a living wage with a career path. Title X of the Energy Independence and Security Act of 2007 defined Green Jobs as employment in the following sectors of the economy: energy-efficient building, construction, and retrofits industries; the renewable electric power industry; the energy efficient and advanced drive train vehicle industry; the biofuels industry; the deconstruction and materials use industries; the energy efficiency assessment industry serving the residential, commercial, or industrial sectors; and manufacturers that produce sustainable



Source: WPB Downtown Development Authority

products using environmentally sustainable processes and materials.^{lvii}

To encourage the Green Economy, the City (by developing partnerships) must identify projected demand for skilled labor associated with implementation of the SAP and other sustainability strategies with economic development agencies, local universities, community colleges, certified apprenticeship programs, workforce development and training programs, businesses, and community agencies. Strengthening and expanding job training partnerships and opportunities that prepare young adults, many with barriers to employment (e.g., lack of education, language/cultural barriers, etc.), to seize existing and future green collar job opportunities are key. The City must also provide ongoing support for local green businesses and industries that provide green collar jobs.

Incentivizing a Green Economy.

The most significant support for green sector development comes in the form of financial and other incentives encouraging the use of energy efficient technologies in new development. Additionally, rather than reduce regulatory oversight, some cities favor imposing green standards on developers. While many developers, green industries, and other entities may be attracted to a jurisdiction because of financial incentives, uncertainty about the commitment of policymakers to retaining these incentives across budget cycles may deter at least some firms. A number of localities have adopted green building programs that create incentives or mandates (or both) to improve the environmental performance in governmental construction and retrofitting projects. And since reductions in energy

use are built into the physical environment, new construction or rehabilitation of existing public buildings creates a new market as well as permanent savings for taxpayers. Enhancing local demand for services such as energy retrofits and solar installations not only reduces energy consumption and GHG emissions, but it also results in increased demand for skilled labor that can do the work.

Partnering to Effectuate Change.

The WPB DDA works to promote and enhance the downtown area and attract new businesses through retail loan and grant programs including large project grants, grand opening assistance and façade grants. For instance in 2009, the DDA worked with the City to conduct regular maintenance walks and approved eight (8) grants for aesthetic improvements. The City, in partnership with the DDA, could work to enhance these incentives by adding “sustainability components” such as energy efficiency grants or loans when spaces are retrofitted for new tenants. The result is a dual benefit of saving new tenants operating costs on their new space as well as showcasing the green attributes of the City’s downtown businesses. A marketing strategy to feature the “green business of the month” could help provide needed marketing exposure for new tenants.



Supporting Business, Developing New Markets and Creating New Jobs.

The diverse and interconnecting factors motivating individuals, companies, and governments to act and invest more sustainably is also creating demand for new products, services, and jobs. With vision, forethought, and planning, WPB can position itself to become a leader in an emerging green economy. The “green economy” is based on jobs that help protect and restore the environment, often through reducing energy, material, and water use or rehabilitating natural resources. In order to sustain a green economy, businesses and consumers must work together to recognize that manufacturing processes, employment practices, and resource conservation should influence trade decisions as much, if not more, than price alone. The tide is already beginning to shift. Many consumers are recognizing the added value of environmentally-friendly products and are willing to pay an initial premium for products that will save their wallets and the environment over time.

Patronizing local and regional farmers through farmers markets, community-supported agriculture, and other efforts to “buy-local” also helps protect farmland and reduce sprawl. These activities strengthen the local food economy, reduce negative environmental

impacts, and improve public health. To generate revenue and provide much needed employment for WPB residents a new native plant nursery could be located in WPB. As the importance of native planting and demand increases, a nursery would be an opportunity to meet WPB's demand for native plants, while serving educational and employment needs. Therefore, an incentive could be to develop and create support for urban farm enterprises. Establishing "Food Truck Rallies" in locations proximate to urban farms could highlight these enterprises.

Recycled products need markets, and markets need both incentives to expand and streams of products to move. Market development should focus on finding and promoting good markets for recyclables wherever they exist. There are two (2) basic sectors of recyclable materials and they require two (2) different approaches to market development: Out-of-state markets exist for traditional residential and business recyclables, including bottles, aluminum and steel cans, paper, plastic and glass. These commodities travel well, so the challenge is to improve markets within the state. Markets are not well developed for organics, including yard trash, compost, mulch, and food waste. Because of the nature of organics, markets need to be developed much closer to the source of the recyclables. Out-of-state markets do not exist and are not feasible. The City could create programs and assistance to encourage the development and growth

of businesses and industry related to green economic development including the energy conservation, renewable energy, sustainable products, and recycling sectors.

Implementation Strategy:

Path to Success:

Generally, the greatest challenge to formulating and implementing a green economic development strategy is the initial support from the business community. Perceived lack of leadership and the "expense" with such a program must be addressed upfront. Some of the feedback is generally that these initiatives are a low priority because of economic hardships that employers and businesses are currently facing. There is also the perception that decisions have to be made in the short term and that there is no direct tangible benefit associated with these types of programs.

To overcome these strategies there has to be a balancing of laws and regulations such as incentivizing or requiring certain green building techniques for different types of construction projects. Surveying how existing initiatives can incorporate sustainability considerations and collaboration between industry, government, trade unions, and educational institutions can help cultivate a workforce which is trained to match the jobs in demand. The Business Development Board and the Chamber will be pivotal in this Focus Area.





Dr. Jay Matteson, director of Palm Beach State College's Institute for Energy and Environmental Sustainability, introduces students to biofuels.

Key for education and outreach is to develop educational programs to help businesses shift to green strategies. The City is evaluating several Green Business recognition programs that promote and encourage energy efficiency retrofits along with strategies to improve efficiencies within a business's day-to-day operations. These programs will also act as an information clearinghouse for how to approach an energy efficiency project, costs involved, as well as provide information on financing opportunities to get any prescribed retrofits installed. Examples could include shifting to

green cleaning products to reduce the risks of exposure to chemicals in cleaning staff and building occupants or the cost savings associated with energy efficiency upgrades. The City should explore if it can, and how it could, offer information on where to access green products, businesses, and services in the WPB area through the creation of a WPB "Green Pages" portion of its website (akin to "Yellow Pages"). Not only could this act as a resource for those looking for local green expertise and products, it will also provide local green businesses an additional platform for exposure.

Enlisting local hotels, tour operators, and visitor travel outlets to communicate information about WPB's sustainability efforts could also be a valuable relationship. This will encourage people to visit WPB, as well as enable them to take the message home to share with others. The message will encourage visitors to be good stewards of our city during their time in WPB. The City could provide incentives to hotels and/or convention planners who conduct "green" events (composting and recycling, avoiding bottled water, using local food, etc.).

New Partnerships also need to be formed. New programs and companies reward customers for increased recycling with discount coupons supplied by local vendors of goods and services. The more items a customer places in the recycling container, the more discount coupons the customer is awarded for use in local retail establishments. The City could work with such a company to feature local vendor coupons with the Chamber and Business Development Board partnering. The City could also help employers of ten (10) or more employees in the City to help reduce employee commute trips.

In collaboration with local business associations and merchants, the City should create, expand and promote a Buy Local campaign. The goal of the campaign would be to build a vibrant local economy by encouraging consumers and businesses to buy local. Shifting more consumer purchases to local businesses has the potential to increase tax revenue for the City, expand local investments in non-profits and local businesses, and create more local jobs while simultaneously reducing vehicle miles traveled.

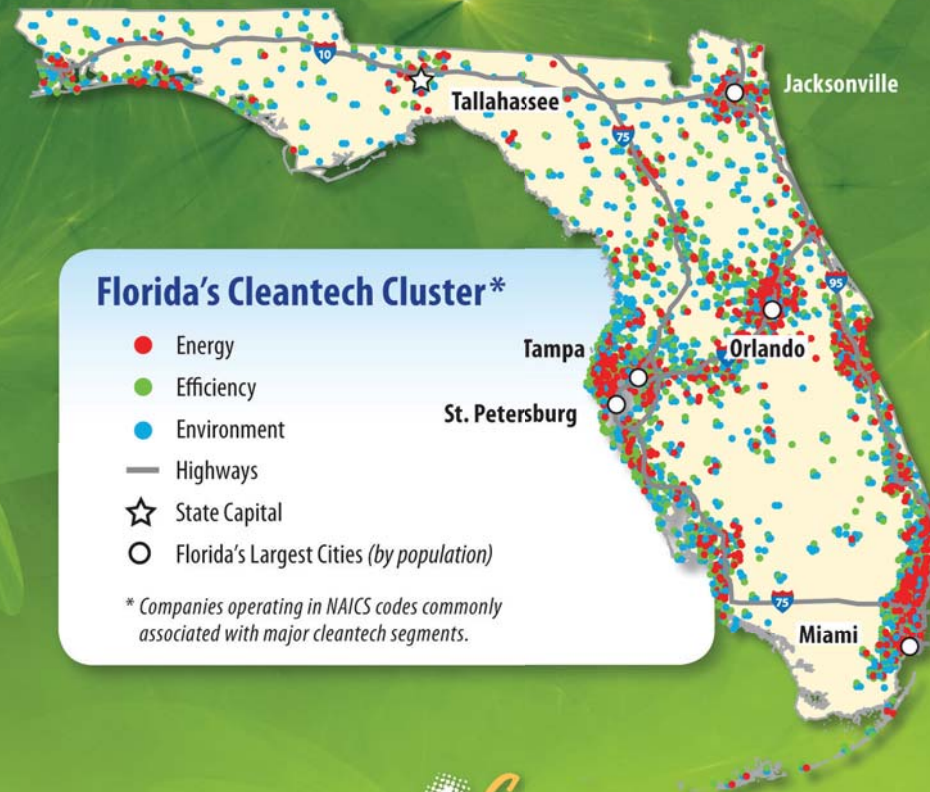
Goals for Growing a Green Economy

GE 1.0:	Form a green jobs /economic development program to create new opportunities for clean energy a tech trades.
GE 2.0:	Recognize and celebrate the environmental leadership of local businesses, business associations, and community groups.
GE 3.0:	Develop incentives to attract green businesses and create green jobs.

CLEANTECH

Fast Facts

- ▶ Florida ranks 7th in cleantech employment, with nearly 103,000 clean jobs
- ▶ Florida really is the “Sunshine State”— home to the nation’s largest solar photovoltaic plant
- ▶ Florida is one of the nation’s largest producers of biomass and agricultural waste—including wood, citrus, sugar, and more
- ▶ Florida’s 1200 miles of coastline and proximity to the Gulf Stream are well suited for all types of ocean energy R&D and deployment
- ▶ Florida offers one of the nation’s largest markets for clean technologies as well as a strategic location to serve emerging markets



Florida's Cleantech Cluster*

- Energy
- Efficiency
- Environment
- Highways
- ☆ State Capital
- Florida's Largest Cities (by population)

* Companies operating in NAICS codes commonly associated with major cleantech segments.

Rev. 10/11



For more information on Florida's Cleantech cluster:

Online: eflora.com/cleantech
 E-mail: information@eflora.com
 Phone: 407.956.5600



Enterprise Florida, the official economic development organization for the State of Florida, helps cleantech companies start up, locate and expand in Florida.

7

Urban Agriculture and Community Gardens



Overview of Food Systems.

Today, the average food is traveling 1500 miles before it arrives on a meal plate. Urban agriculture and community gardens provide a realistic and viable solution to growing problems such as increasing global carbon dioxide emissions, obesity, and food security within the United States. There is a movement to reverse this trend in proactive cities throughout the U.S. Keeping the food supply local and fresh reduces the need for excessive packaging and travel in addition to significantly reducing the amount of GHG emissions. The greatest reduction in GHG emissions will be seen by those residing in cities with urban farms and community gardens where produce is available in a location that requires little transportation for the farmer to bring the product to market and for the consumer to acquire, such as a neighborhood community garden, urban farm market, or a local city farming market.

A food system includes everything from farm to table. A community food system is a food system in which food production, processing, distribution and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular place. Food systems have become important topics for public sector consideration and sustainability due to their impacts on public health, quality of life, environmental stewardship, and GHG emissions. Thoughtful planning can ensure

that citizens have access to healthy, locally-produced foods. Enhancing our local food system infrastructure by establishing and supporting more small farms and urban gardens and building on creative initiatives can improve citizens'

access to healthier, locally-grown food. It will be necessary to re-think ideas of space, gardening techniques, and even growing mediums when it comes to food production in cities.

Community food systems are comprised of four (4) main concepts: food security, proximity, self-reliance and sustainability. Food security is a key goal of community food systems addressing food access within a community context, especially for low-income households. Proximity refers to the distance between various components of the food system. Self-reliance refers to the degree to which a community meets its own food needs. Sustainability refers to following agricultural and food system practices that do not compromise the ability of future generations to meet their food needs.



Photograph courtesy of Greg Matthews

Elements of a community food system can include, but not be limited to: farmers' markets, community and school gardens, community supported agriculture ("CSA") farms (a group of people buy shares into the eventual harvest of a farm) and u-pick operations and roadside farm stands.

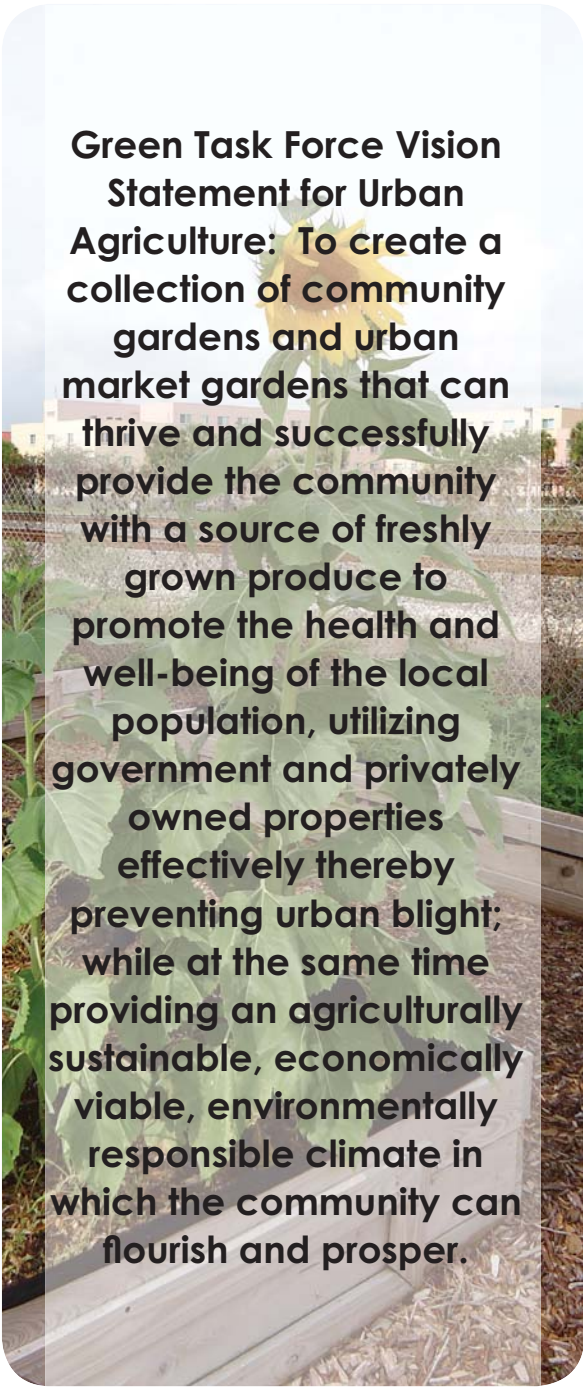


City Efforts to Date.

The Urban Agriculture and Community Gardens Sub-Committee of the City Green Task Force was comprised of local farmers, local business owners, gardeners, City residents, and a registered dietitian. Members and staff met through the course of six (6) months and held discussions that led to recommendations for the allowance of community gardens and urban market gardens within the City. At a Mayor/Commission workshop held on October 25, 2010, direction was provided to process

code changes as a pilot program which can be summarized as follows:

1. Applicable to the first five (5) Level I site plan approvals for either a community garden or urban market garden by December 31, 2011.
2. Pilot Duration Period - by December 31, 2013, upon review of a report by the Planning Director on the effectiveness of the said pilot program, the Commission may consider extending, extending with modifications, or sunseting the pilot program.
3. Community Gardens are permitted with extra requirements in a Residential Planned Development ("RPD"), Neighborhood Commercial ("NC"), General Commercial ("GC") and the Northwood Mixed Use District ("NMUD") Building Type I zoning district; or permitted with extra requirements in any zoning district if accessory to any religious place of assembly, government operated social services facility, community center, or institutional use.
4. Community Gardens will not be permitted in the Downtown Master Plan ("DMP") or any residential zoning district (except in a Residential Planned Development ("RPD") with extra requirements).
5. Urban Market Gardens are permitted with extra requirements in Neighborhood Commercial ("NC"), General Commercial ("GC"),



Green Task Force Vision Statement for Urban Agriculture: To create a collection of community gardens and urban market gardens that can thrive and successfully provide the community with a source of freshly grown produce to promote the health and well-being of the local population, utilizing government and privately owned properties effectively thereby preventing urban blight; while at the same time providing an agriculturally sustainable, economically viable, environmentally responsible climate in which the community can flourish and prosper.

Community Service ("CS") and Industrial ("I") zoning districts; or permitted with extra requirements when accessory to any religious place of assembly, institutional use (i.e. school, hospital), or community center located within the above referenced zoning districts. Urban Market Gardens will be permitted in Planned Developments, with a Class B Special Use Permit in Residential Planned Development ("RPD"), Commercial Planned Development ("CPD"), Community Service Planned Development ("CSPD") and Industrial Planned Development ("IPD") zoning districts.

These programs will help families, children, and property/businesses owners learn and benefit from the principles of sustainability that the garden is designed to represent. Planning for Urban Agriculture and Community Garden initiatives generally should involve the development of a "Vision Statement" outlining values and principles related to various elements in the system from production to disposal.^{lviii}

Establish Existing Conditions.

In order to develop measurable goals and track progress towards meeting those goals, existing conditions should be documented related to Urban Agriculture and Community Gardens resources. Known as a "food-

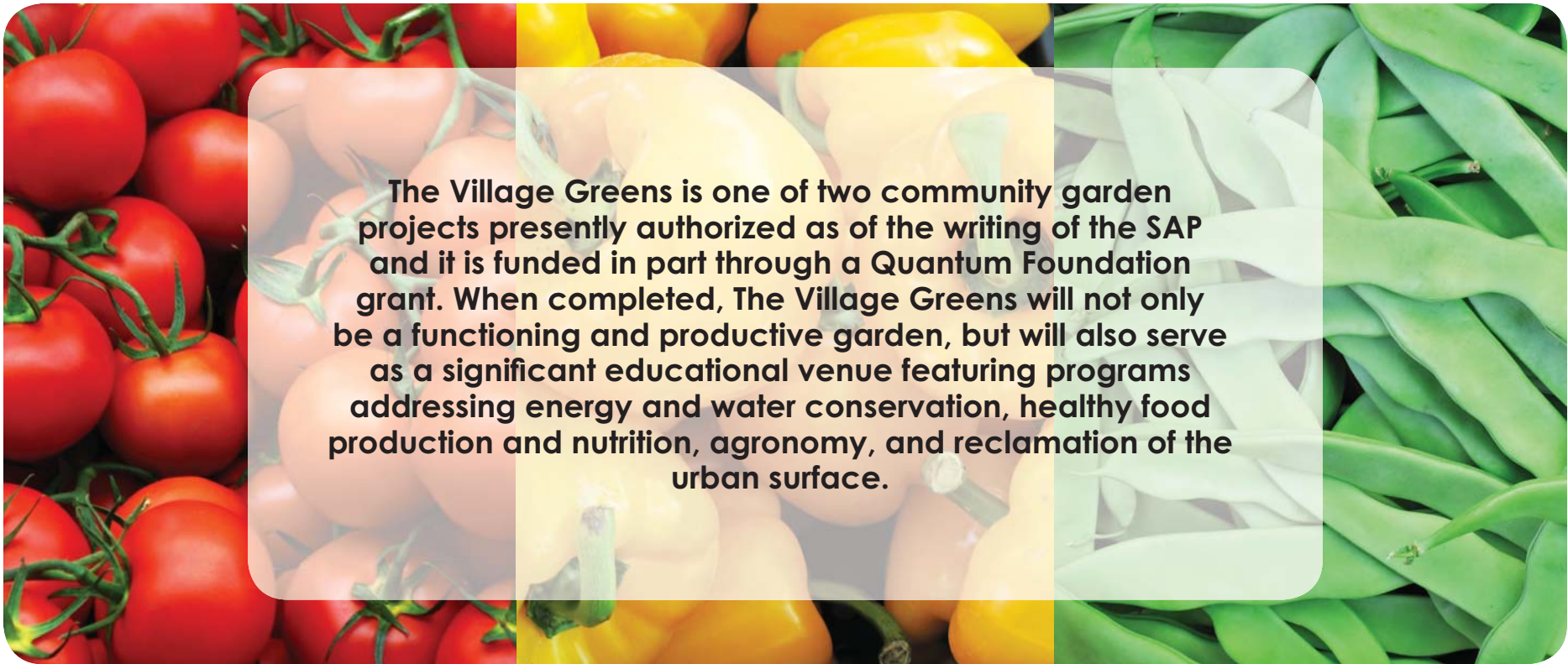


Photograph courtesy of Greg Matthews

system assessment",^{lix} the existing conditions should cover important baseline information such as:

- Land availability and suitability for food-system activities including gaps in our knowledge about the system;
- Existing government and nongovernmental programs and policies;
- Local and number of food sources and outlets within the City;
- Opportunities and deficiencies to serve urban agriculture projects and community gardens;
- Strategic options with the level and type of governance where responses can be most effective in moving the food system of WPB towards sustainability goals; and
- Institutionalize capacity building efforts within WPB in the areas of sustainable food production, processing, distribution and waste treatment.





The Village Greens is one of two community garden projects presently authorized as of the writing of the SAP and it is funded in part through a Quantum Foundation grant. When completed, The Village Greens will not only be a functioning and productive garden, but will also serve as a significant educational venue featuring programs addressing energy and water conservation, healthy food production and nutrition, agronomy, and reclamation of the urban surface.

A comprehensive approach to addressing community food systems begins with a food system assessment.^{ix} Part of this food-system assessment existing conditions baseline would include the fact that the City is already taking aggressive steps to create and implement policies related to Urban Agriculture and Community Gardens. For instance in the City's NSP2 Grant application, the following was incorporated:

Partnering with entities like the Palm Beach County Extension Service will further these types of programs by utilizing their expertise, such as the Master Gardener program, Family and Consumer Sciences, and the University of Florida/IFAS Living Green program. Additionally, in November 2010, the City adopted Approve Ordinance No. 4309-10, approving amendments to the Zoning and Land Development Regulations

to create a pilot program for a Community Gardens and Urban Market Gardens.

Once the existing conditions baseline has been established, future updates to the SAP should include meaningful objectives and targets to reduce emissions and reach other related goals .

Implementation Strategy:

Path to Success:

The challenges for increasing urban agriculture and community gardens can be fairly well-defined. For instance, many involved in urban agriculture do not own the land they use to grow food.

Without title, or three (3) to five (5) year leases, they risk losing their investment when the land is taken for other purposes. Agriculture enterprises have start-up costs that can be an obstacle to people with limited income. Costs include: labor, site management, water, tools and equipment, rent and insurance, processing, packaging, and marketing materials. Growers often find it difficult to market their locally-grown foods to groceries, restaurants, and institutions because of wholesale distributors' monopolies. Urban growers may lack the knowledge and skills in production, processing and marketing that would bring about successful yields and food security. In many climates, food production is seasonal and thus not as dependable as a year round source of food security. Many urban residents have limited knowledge and access to facilities for preserving foods that they grow. There are particular health challenges connected to farming in the city. For example, urban soils can be contaminated with heavy metals such as lead. Certified organic farms must have 50 ft of land between a production area and a site of possible contamination. Finally, regional economic trends, community relations, local institutional support, and the stage of urban agricultural development all affect the challenges (and successes)



**Approximately 23.5 million
Americans live in a food desert
- USDA**

(Food desert: Geographic area with no or distant mainstream grocery stores or imbalance of food choices)

experienced by gardeners and farmers.

One way to overcome some of these challenges is by creating the initial baseline from which to measure progress and identifying funding necessary to increase urban agricultural opportunities. Urban agriculture can contribute to maintaining open space and biodiversity within the urban fabric. A city that promotes urban agriculture can have green space that pays taxes rather than costing taxpayers money. The assessment should include recommendations for access to sites including conservation easements, trusts, rooftops, roadsides, and institutional properties and arrangement where property can be held for useful purpose as long as it is properly maintained. Other strategies to increase opportunities for WPB include creating a sub-committee of the Sustainability Advisory Committee tasked with the specific deliverable of completing the food-system assessment. A way to help fund the food system assessment would be to look for partners such as Palm Beach State College, or other educational institution, to develop a semester project or scope of work to collect data.



On the education side, developing a consumer campaign on the benefits of eating and buying food locally can help spur demand for such products. This would require the City to provide marketing support, possibly develop a locally grown in WPB food label, increase nutrition education, working to enhance training in urban agriculture, providing programs (after school; community based activities) and use of use social networks. The power of partnership can help to achieve these goals also. There is also a newly formed Florida Food Policy Council (“FFPC”) which has a Leadership Board with representatives from south, central and north Florida.^{lxii} The FFPC will support local foodshed initiatives by a variety of means, such as legislation, education, action committees,



fund raising events. More locally, there is the PBC Community Food Alliance (“CFA”) focusing on collaboration, coordination and cooperation among and between organizations, companies, and agencies that are committed to ending hunger in our community. The goal of the CFA is to assure that all Palm Beach County residents have access to and obtain safe, sufficient, culturally acceptable, and nutritious food through a sustainable system that maximizes self-reliance, social justice, and health. The alliance is an initiative of United Way of Palm Beach County.

Urban agriculture includes an alternative source of fresh produce and a way to preserve cultural identity and traditions.



Most importantly, urban agriculture can serve as a tool in securing food security and positive health outcomes for underserved communities. Additional benefits of urban agriculture beyond food provision include building job skills, improving self-esteem, and contributing to community revitalization. Finally, encouraging sustainable agriculture through urban farms and community gardens within the City will decrease our City’s carbon footprint, improve the health of adults and children within the community, increase community involvement and learning, improve food security, and bring revenue to the City while preserving our natural resources for the next generation.

Goals for Urban Agriculture and Community Gardens

UA 1.0:	Provide community gardens in interested neighborhood. ^{lxi}
UA 2.0:	Complete a food-system assessment and specific plan to promote urban agriculture and community gardens with goals and targets.
UA 3.0:	Create a partnership with not-for-profits, for-profits, business associations and others to develop incentives that work to encourage urban farms and agricultural opportunities.

Implementation



The preceding chapters illustrate where WPB's GHG emissions come from and set forth a series of goals, targets, indicators and actions for achieving success. Extensive input went into developing the content of these chapters, but the component of WPB's SAP effort that matters most still lies ahead: Implementation. Although significant GHG reduction policies and programs are already in place, the actions proposed in this plan, by necessity, far surpass the scale of existing efforts. Implementing the SAP and ensuring that it results in real, additional GHG emissions reductions necessitates new and sustained resources, increased coordination across sectors, and a system for evaluating and reporting progress. In short, it requires institutionalizing sustainability efforts throughout the community.

On an annual basis, the Sustainability Advisory Committee, City Administration and City Commission will receive a Progress Report from the Office of Sustainability detailing all successes, trends and areas for improvement in the SAP. The Sustainability Advisory Committee will receive a Progress Report from the Office of Sustainability illustrating progress on Goals, Indicators and Targets/Trends and Indicators. The Progress Report will illustrate progress on Goals, Targets/Trends and Indicators. The Progress Report is a longer and more detailed update on the SAP based upon the progress made relative to each Goal. The Progress Report will be used to create the Annual Report Card, in shorter summary

format, for wider distribution within the City and the surrounding community through the local media, sustainability web site, and community organizations. It is the intent of the Annual Report Card to share successes and challenges with the overall community and to inspire others to follow our example. Sharing information and networking with the larger community are absolutely critical for the success of our efforts. The Annual Report Card will also provide an opportunity to receive guidance on implementation priorities, resource allocation; to present updates on the latest scientific assessments of the scale of GHG reductions necessary to achieve climate stabilization; and to report progress made on specific indicators and metrics to be used for tracking the implementation of actions in the plan, including:

- Estimated GHG reductions
- Implementation Status
- Progress towards Targets
- Barriers or changes in strategy

The City will also maintain a web-based portal that enables the City to effectively and transparently communicate the goals outlined in the SAP and progress toward achieving those goals. It is also anticipated that no less than every three (3) years, the City will revisit and updated the GHG Inventory as part of this annual process. Sharing information and networking with the larger community are absolutely critical for the success of our efforts.



Funding.

Implementing the SAP requires significant investment. However, a concerted effort to reduce GHG emissions will result in cost savings over time by reducing ongoing costs associated with energy consumption. Implementing the SAP also requires sustained, strategic public investment by the City, by regional government agencies, and by the state and federal governments. Public funding will play an important role in helping to provide the education and outreach, services, incentives and capital projects that are needed to achieve the plan's goals. In addition to maintaining City resources for implementation of the SAP and seeking new sources of outside funding, we also outline various strategies that would be designed to both create disincentives for practices that are energy intensive (e.g., driving) and build sustained revenue for services and programs that help the City achieve its emissions reduction goal along with other important co-benefits.

The 2011 SAP actions will be funded using the following funding sources: existing operating department budgets, federal and state grant funding, and cost sharing with other local municipalities. Due to budget challenges, the initiatives are generally limited to what the City can do with existing resources. In some cases, the funding source is identified in the action step.

GUARANTEED ENERGY PERFORMANCE CONTRACT PROJECT

Benefits

The project is anticipated to result in \$11 million in reduced energy and operations costs over a 15-year term.

Annual Impact

- 4,642,022 KWh Saved
- 14% Reduction in Electricity
- 492 KGal Saved
- \$76k Grant Project Savings

**WPB Carbon Footprint Reduced Annually
by 11,140,852 Pounds of Carbon Dioxide**

equivalent to

**Removal of Greenhouse Emissions from
650 Passenger Vehicles Annually**

or

Planting 1,346 Acres of Pine Trees Annually

Intergovernmental Coordination/Partnerships.

Collaboration across jurisdictions can help create successful plans and policies for addressing sustainability and climate change. Working with other jurisdictions, as well as with regional businesses and community stakeholders, allows local governments not only to share knowledge and resources and build connections, but also to coordinate economic development, open space, land use, and transportation planning strategies. Regional approaches, including setting regional emissions reduction targets and adopting region-wide goals, can help increase the overall efficacy of a SAP.

One such region-wide initiative is the Southeast Florida Regional Climate Change Compact (the "Compact") a joint commitment of Monroe, Broward, Miami-Dade and Palm Beach Counties that have partnered in mitigating the causes and adapting to the consequences of climate change. The Compact was formalized in 2009 following the Southeast Florida Climate Leadership Summit, when elected officials came together to discuss challenges and strategies for responding to the impacts of climate change. The Compact outlines a collaborative effort to participate in a Regional Climate Team toward the development of a Southeast Florida Regional Climate Change Action Plan. Specifically, the Compact includes seven (7) commitments on the part of the participating counties:

- Each county shall work in close collaboration to develop a joint policy position urging the United States Congress to pass legislation that recognizes the unique vulnerabilities of Southeast Florida to the impacts of climate change and to further a joint policy position that includes specific recommendations regarding the allocation of federal climate change funding based on vulnerability to climate change impacts.
- Each county shall work in close collaboration with the other counties to develop additional legislative policy statements relating to global climate change and future legislation to be considered by Congress for transmittal to the local delegation members.
- Each county shall work in close collaboration to develop joint

position statements on proposed State legislation and energy/ climate policies.

- Each county shall work to develop joint position statements for future State legislation.
- Each county shall commit appropriate staff resources and expertise, within budget constraints, to participate in a Regional Climate Team with other counties toward the development of a Southeast Florida Regional Climate Change Action Plan.
- Each county shall work to develop a Southeast Florida Regional Climate Change Action Plan. The Action Plan could, at a minimum, include the following components:
 - o A baseline of greenhouse gas emissions for Southeast Florida;
 - o Strategies for coordinated emission reductions throughout the built environment to include the use of energy efficiency, energy conservation, and the use of demand-side renewable energy resources;
 - o Strategies for coordinated emission reductions from the transportation sector to include increased reliance on public transit, emerging vehicle technologies, and advanced biofuels;
 - o Strategies for coordinated emission reductions resulting from changes in local and regional land use;
 - o Strategies for the coordinated regional preparation for and adaptation to a rapidly changing global environment based upon regional mapping of projected sea-level rise and any resulting amplification of localized impacts of tropical cyclone events. Such strategies shall incorporate climate preparation concerns for the regional economy, regional infrastructure and the built environment, social and cultural needs, and natural systems within the four (4) counties party to this compact.
 - o Each county shall commit to participating with other counties party to this compact in hosting the Second Southeast Florida Regional Climate Change Summit in October, 2010.

There are also several work groups and sub-groups compiling information to complete work products including a Greenhouse Gas

Work Group, Vulnerability Work Group, and the Sea Level Rise Work Group. Finally, the Regional Climate Change Action Plan is being developed with a strategy of focusing on priority planning areas, narrowing that focus through vulnerability and risk analysis and integrating it with the concepts of mitigation and adaptation. The Focal Areas of the Plan include: Land and Natural Systems, Transportation and the Built Environment.

Due to its topography and relationship between the built and natural environment, Florida is on the “front lines” facing the challenges of Greenhouse Gas Management and Climate Change. It is incumbent on the City of West Palm Beach to take a leadership role in lowering its capital cost by managing energy use. At the same time, the City will realize the numerous benefits of becoming a “Green City” both from a community and resource protection standpoint. Only through collaboration, partnerships, information exchange and committed leadership will the vision outlined at the beginning of the SAP be achieved.

The **roadmap** has been created.

The **commitment** has been made.

The **benefits** have been identified.

Success in achieving specific goals can be **measured**.

The **costs** of inaction are too great.

Join us as we implement the SAP and “**Rethink Paradise for a Green City.**”



The City of West Palm Beach would like to thank the following community members, organizations, and staff for their commitment to the betterment of the City through the development of the Sustainability Action Plan.

City Commission and Mayor

Mayor Geraldine Muoio
Commissioner Kimberly Mitchell
Commissioner Sylvia Moffett
Commissioner Keith James
Commissioner Isaac Robinson Jr.
Commissioner William Moss

City Administration and Staff Support

Ed Mitchell, City Administrator
Dorritt Miller, Assistant City Administrator
Neil Melick, Assistant City Administrator
David Hanks, Public Utilities Director
Penni Redford, Sustainability Manager
Josh Nichols, Sustainability Coordinator
Amanda Zachritz, Sustainability Program Specialist
Suzanne Schluter, Sustainability Program Assistant
Scott Alef, Sustainability Intern

City Green Task Force

Al Vazquez, Green Task Force Chair
Ira Raab, Green Task Force Vice Chair

Green Task Force Members: Michelle Parenti Lewis, Patricia Lodge, Janet Schreiber, Carol Shein, Louise Reed, Harvey Hathaway, Arnold Rimm, Robert Cannellos, Kevin Petrovsky, John DeCarion, Harriet Sacher, Steve Scherer, Steve Corson, Everett Fennel, Lisa-Marie Lerner, Myles Schack, Joy Rudy, Rose Campbell, Linda Portner, Charles Muoio, and Philip Massa.

Green Task Force - Green Building Subcommittee:

Erin Deady – Subcommittee Chair

Subcommittee Members: Carol Shein, Charles Bantel, Steve Lewis, Shirley Simpson Wray, and Kenny Breeze

Green Task Force - Urban Agriculture and Community Gardens:

Michelle Parenti Lewis, Subcommittee Chair

Subcommittee Members: Dina Clingman-Bell, Stewart Bosley, Jeff Lintz, Kenneth Koleos, Alice Bojanowski, and Fredrick Ritter

Sustainability Advisory Committee (Past and Present Members)

Jonathan Burgess – Chair

Rafael Rodriguez – Vice Chair

Mary Jo Agerstoun

Lew Crampton

Jonathan Jadunandan

Edwin King

Frank Navarro

Janet Scheiber

Kisha Jarrett

Kimberly Spence

Consultants

Lewis, Longman and Walker

VHB - Miller Sellen

AECOM

- i. Since the 1987 United Nations Conference on the Environment and Development.
- ii. Founded in 1989, The Natural Step is a non-profit organization founded with the vision of creating a sustainable society by providing international research and dialogue about sustainable development. The approach is a science based model that helps communities and businesses better understand and integrate environmental, social, and economic considerations.
- iii. Toward a Sustainable Community: A Toolkit for Local Government
- iv. See 2006 Fla. Laws ch. 230 (S.B. 888); Exec. Order No. 07-126, Leadership by Example: Immediate Actions to Reduce Greenhouse Gas Emissions from Florida State Government (July 13, 2007); Exec. Order No. 07-127, Immediate Actions to Reduce Greenhouse Gas Emissions within Florida (July 13, 2007); Exec. Order No. 07-128, Florida Governor's Action Team on Energy and Climate Change (July 13, 2007).
- v. Hodgson, Kimberley, Marcia Caton Campbell and Martin Bailkey. 2011. Urban Agriculture: Growing Healthy, Sustainable Place. Chicago: American Planning Association and MetroAg: Alliance for Urban Agriculture.
- vi. See HB 7207 amending Section 163.3177(6)9.a.VIII, F.S. and Section 163.3177(6)9.b.IV, F.S.
- vii. Center for Energy, Economic & Environmental Policy (CEEPP) of Rutgers University, Microeconomic Impact of CO2 Reductions in New Jersey.
- viii. Rose, A. and D. Wei, "The Economic Impact of The Florida Energy and Climate Change Action Plan on the State's Economy." The Center for Climate Strategies, May 15, 2009.
- ix. Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.1, May 2010.
- x. Florida Clean Car Emission Rule, 62-285.400, F.A.C., became effective on February 15, 2009.
- xi. Extended Producer Responsibility" ("EPR") is a strategy that holds manufacturers accountable for their products and packaging through their entire lifecycle. In this way, product producers are responsible for designing products to be durable or easily recyclable, taking back spent products from consumers and either reusing or recycling them, and/or contributing to recycling infrastructure.
- xii. Jeb Brugmann, The Next Practice Ltd, prepared for ICLEI - Local Governments for Sustainability, "ICLEI, 2011, Financing the Resilient City: A demand driven approach to development, disaster risk reduction and climate adaptation - An ICLEI White Paper, ICLEI Global Report".
- xiii. Case Study: To Mr. Bloomberg, New York is competing—especially with London—to be one of the great cities of the 21st century, attracting the increasingly mobile and wealthy global elite. His plan addresses what he sees as the three chief challenges facing the city as it makes that transition. First, he expects New York's population, already at a record high, to grow by around 1m by 2030, to 9m. Second, the city's infrastructure—much of it a century old—is crumbling, and needs to be upgraded. Third, the city must become much greener. To transform New York into a "sustainable city" Mr. Bloomberg has set ten goals, to be monitored by a new Sustainability Advisory Board made up of scientists, scholars, academics, city planners and environmentalists.
- xiv. Sustainability in the Federal Government: A Candid Survey of Federal Executives. Government Business Council Insight Report I 2010.
- xv. Case Study: The Chicago Department of Transportation has taken the lead in integrating "green infrastructure" into transportation infrastructure to enhance ecological services through a number of programs including the Green Alley Program, Mayor Daley's GreenStreets, Sustainable Streetscapes and Landscaped Median Projects.
- xvi. Case Study: The Sustainability Plan will be adopted as an element of the Comprehensive Plan, but will also function as a stand-alone document. It will expand upon and complement the recommendations contained in the Comprehensive Plan, in some cases confirming and re-emphasizing elements, while in other areas filling in the gaps. The Sustainability Plan highlights seven (7) themes: cleanliness, pollution prevention, resource conservation, greening, transportation, environmental education and awareness, and the green economy. The Comprehensive Plan focuses on schools, culture, community design, land use and economic development issues. All of these issues are important for a successful, sustainable Baltimore.
- xvii. Baltimore Office of Sustainability.
- xviii. Nathan J. Francis Richard C. Feiock. A Guide for Local Government Executives on Energy Efficiency and Sustainability

- xix. Naimish Upadhyay & Robert Brinkmann. "Green local governments in Florida: assessment of sustainability performance". Sustainability: Science, Practice & Policy. Spring 2010 | Volume 6 | Issue 1. Department of Geography, University of South Florida.
- xx. www.transformbaltimore.net
- xxi. Case Study: Chicago is known as a leader of integrating the protection of urban forests and tree canopy into a significantly built urban environment. Their Ordinances have led to the planting of over 112,000 trees as of 2007. They targeted building construction projects and parking lots, requiring the planting of trees, landscape islands and hedges. They also required the planting of shade trees along parkways. The City also installed cooling and reflective landscapes to address urban heat islands, which cause a rise in energy costs and heat-related fatalities each year. The City has used urban heat island mapping to prioritize tree planting (4,431 trees in 2006 and 2007) and green-roof installation, in addition to partnering with LaSalle Bank to plant trees along the route of the Chicago Marathon. The "Adding Green to Urban Design Plan" represents the collaborative effort of City departments, public agencies, professionals and public task forces providing direction to the City of Chicago in developing and improving the City's built environment. The Plan identifies 21 actions to (1) capture and use precipitation and encourage water conservation, (2) improve air quality, (3) preserve and expand the quality and function of vegetated surfaces and (4) improve safety and public health and engage people in the outdoor environment.
- xxii. See Chapter 17B of the Code of Ordinances – Street Trees and Article 26 of the Zoning Ordinance – Tree Protection.
- xxiii.
- xxiv. Kim, H., E.A. Seagren and A.P. Davis, 2000: Engineered bioretention for removal of nitrate from stormwater runoff. WEFTEC 2000 Conference Proceedings on CDROM Research Symposium, Nitrogen Removal, October, Anaheim, California.
- xxv. <http://www.itreetools.org/> & <http://www.fs.fed.us/psw/programs/cufr/> and <http://www.climateregistry.org/about.html>. A software program used to calculate the monetary values of the economic and ecological benefits (including stormwater run-off, air pollution removal, and carbon storage) provided by the trees and other green spaces in specific locations areas. <http://www.americanforests.org/productsandpubs/citygreen/>.
- xxvi. U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2008.
- xxvii. See Electric Power and Renewable Energy in Florida, U.S. DEP'T OF ENERGY, <http://apps1.eere.energy.gov/states/electricity.cfm/state=FL> (last visited Oct. 10, 2010). Only California and Texas consume more. See Consumption, Price, and Expenditure Estimates, U.S. ENERGY INFO. ADMIN., http://www.eia.doe.gov/emeu/states/_seds.html (last visited June 28, 2011).
- xxviii. See ACTION PLAN, supra note 4, at 3-1.
- xxix. See ACTION PLAN, supra note 4, at 17 (showing greatest potential for GHG reductions in energy supply sector compared with transportation/land use or agriculture, forestry and waste management).
- xxx. See ACTION PLAN, supra note 4, at 3-5 tbl.3-1.
- xxxi. See Florida Electric Restructuring Not Active, U.S. ENERGY INFO. ADMIN, <http://www.eia.doe.gov/cneaf/electricity/page/restructuring/florida.html> (last visited June 28, 2011).
- xxxii. See Florida Electricity Profile, 2008, U.S. ENERGY INFO. ADMIN. tbl.3, http://www.eia.doe.gov/cneaf/electricity/st_profiles/florida.html (last visited June 28, 2011); See Fact Sheet, FLA. MUN. ELEC. ASS'N, http://www.publicpower.com/pdf/fmea_factsheet.pdf (last visited June 28, 2011).
- xxxiii. Siting Renewable Energy: Land Use and Regulatory Context, Uma Outka.
- xxxiv. See FLA. PUB. SERV. COMM'N, FACTS AND FIGURES OF THE FLORIDA UTILITY INDUSTRY 2 (2009).
- xxxv. See NAVIGANT, supra note 57, at 23. The study projected technical potentials for each resource, which it then constrained in accordance with favorability scenarios, accounting for the influence of factors such as fossil fuel prices, cost of carbon under greenhouse gas emissions policies, federal and state renewable energy tax credits and other incentives, the availability and cost of debt and equity, and the rate cap established for the purchase of renewable energy credits. See id.
- xxxvi. See 2008 Fla. Laws ch. 227 (H.B. 7135).

- xxxvii. Every five years, the Florida Energy Efficiency and Conservation Act requires the Public Service Commission to set numeric energy conservation goals for regulated utilities. In 2009, a goal-setting year, the commission applied 2008 amendments to the statute that require the goals to be based on "the full technical potential of all available demand-side and supply-side conservation and efficiency measures, including demand-side renewable energy systems." FLA. STAT. § 366.82(3) (2009); see Commission Review of Numeric Conservation Goals, 2009 Fla. PUC LEXIS 1100 (Fla. P.S.C. 2009).
- xxxviii. U.S. Department of Transportation, Federal Highway Administration, "New Trends in Transportation and Land Use Scenario Planning: Five Case Studies of Regional and Local Scenario Planning Efforts", April 2010.
- xxxix. The Safe and Complete Streets Act of 2011 was introduced in the House on May 5, 2011. This bipartisan legislation, HR 1780, is designed to ensure safety and ease of access for all users of transportation by requiring accommodation of their needs during planning and development. If approved, the legislation would direct all states to pass a law, and MPOs to approve an explicit statement of policy, that all transportation projects will comply with Complete Streets principles. To date, more than 200 local jurisdictions and 23 states have adopted Complete Streets policies.
- xl. The correlation between density and VMT has been measured in studies including but not limited to: a) Holtzclaw et al, "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco;" b) Norman et al, "Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions;" c) Cervero, The Transit Metropolis; d) Cervero et al, "Travel Characteristics of Transit-Oriented Development in California;" e) Dittmar & Ohland, The New Transit Town; f) Center for Neighborhood Technology, "Hidden in Plain Sight."
- xli. Case Study: New York State Department of Transportation created the Green Leadership in Transportation and Environmental Sustainability ("GreenLITES") in September 2008, a certification program that recognizes projects and operations that incorporate sustainable practices. The more green practices performed, the higher the certification level that can be achieved. GreenLITES is modeled after LEED. Depending on the cumulative score acquired by incorporating sustainable choices into project design or operations, one of the following GreenLITES certification levels may be assigned:
- Certified: Certification is awarded for incorporation of a number of sustainable choices.
 - Silver: Silver certification is awarded for incorporation of a number of sustainable choices with several of these choices having a high level of impact, or having advanced the state of practice.
 - Gold: Gold certification is awarded for incorporation of a substantial number of sustainable choices with many of these choices having a high level of impact, or having advanced the state of practice.
 - Evergreen: Evergreen certification is awarded for incorporation of the highest number of sustainable choices with many of these choices having an extremely high level of impact. Additionally, these efforts may advance the state of practice or are innovative in the way environmental sustainability is approached.
- xlii. Greenroads is a sustainability rating system for roadway design and construction. It is applicable to all roadway projects including new, reconstruction and rehabilitation (even overlays) and bridges. Greenroads is a collection of sustainability best practices, called "credits," that relate to roadway design and construction. Achieving these credits can earn points toward a total score for the project, and in general, this score can be used as an indicator of sustainability for the roadway. Four different certification levels (rating) are available depending upon total score on a voluntary basis. The more points the higher the certification level. Currently, there are 4 certification levels: Certified, Silver, Gold, and Evergreen. In 4 years of development, Greenroads has been tested on over 50 design and construction projects, of various types, shapes, sizes and stages of design and construction.
- It is an approach to considering roadway sustainability through a defined and quantitative means to assess projects. This approach is an example of a tool for decision-makers, agencies, consultants and contractors that enable informed design and construction decisions regarding sustainability. The idea of this system is to present roadway sustainability in a straightforward manner so that everyone can understand and participate in roadway sustainability. This type of system can evaluate two proposals using a common point system to determine their relative impact. The system, or one like it, also provides market recognition for sustainability efforts.
- xliii. Chapter 255, F.S. now includes a definition for "Sustainable building rating or national model green building code" rating" that now includes the International Green Construction Code ("IGCC").
- xliv. EcoArt language is included in "jurisdictional electives" (page 21 of the ordinance). In "Site and Land Use" (page 29) and "Public Art" (pp 48-49). The other place where EcoArt was inserted in a municipal ordinance was Chapter 27 of Jupiter's municipal ordinance 39-10 mentions EcoArt at Section 27-1831 Small scale planned unit development requirements).

- xlvi. Case Study: With the support of Clean Air-Cool Planet and Sustainable Nantucket, two non-profit organizations concerned with climate change mitigation, Nantucket residents have formed a "Historic-Green Committee," made up of Historic District Commission (HDC) members, local builders, renewable energy professionals, architects, restoration specialists, LEED accredited professionals, and homeowners. The primary goal of the Historic-Green Committee is to produce a sustainability-focused addendum to Building with Nantucket in Mind, a comprehensive architectural history and construction guide for the island. The addendum, included as an appendix to this guide, addresses windows and door weatherization, solar energy technologies, wind turbines, alternative roofing and siding strategies, rainwater capture, and landscaping. This information will help residents to embark upon projects that increase energy efficiency and the use of renewable technologies, while also maintaining the historic integrity of individual buildings and the island. Nantucket hopes that these guidelines will serve as models for other HDCs in New England.
- xlvi. Case Study: Philadelphia is developing a new model for financing the energy retrofitting of commercial buildings that goes back to the basics of real estate lending. The Greenworks Loan Fund seeks to make energy efficiency financing an ordinary part of the lending process for either the rehabilitation of existing commercial buildings or the construction of new ones. This new revolving loan fund, which is capitalized through a combination of federal stimulus and private funding, will finance energy projects that show a 25% reduction in energy use. Philadelphia aspires not only to achieve significant energy savings with its new program, but to transform how banks and other private lenders understand the financing of energy efficiency in commercial properties, and to create a model that can be replicated in other cities.
- xlvi. HOPE VI Program, originally known as the Urban Revitalization Demonstration (URD), was developed as a result of recommendations by the National Commission on Severely Distressed Public Housing, which was charged with proposing a National Action Plan to eradicate severely distressed public housing.
- xlvi. Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, September 2009.
- xlvi. Case Study: The City of Boulder, Colo., requires at least 50% of waste from the construction of new buildings and major renovations or demolition of existing buildings to be diverted from landfills. A free deconstruction assessment and consultation is provided through a local non-profit and the city provides a list of area options for developers and property owners to reuse, donate or recycle C&D materials. In a program requiring similar levels of C&D diversion, the Town of Atherton, Calif., offers "house demolition sales" whereby salvageable materials may be given or sold directly from the property at a publically announced sale.
 - I. Final Draft, Materials Separation Plan, February 2010
 - ii. Of the 414 city and 67 county governments in the state, 61 cities and eight (8) counties have some form of mandatory commercial recycling affecting about 5.2 million people, mostly in Miami- Dade and Volusia counties.
 - iii. Right now, Sarasota County's recycling program enforces commercial recycling and requires Pay-As-You-Throw, giving it both the highest commercial (53%) and overall (41%) recycling rates in Florida, a healthy start on 75% by 2020.
 - iiii. 75% Recycling Goal Report to the Legislature (2010).
 - liv. Case Study: RecycleBank is a private organization that works with interested communities to set up its system. In March 2009, it launched its first program in Florida with the City of North Miami. Early indications show recycling has substantially increased in areas where previously there was little. Recycle Bank is a rewards program where residents can earn points for proper recycling that can be redeemed through participating local and national businesses. In late May 2010, a six month pilot was implemented in South Meadowview. A 7% decrease in contamination was experienced in the pilot area. The pilot has been extended an additional three months to consider the feasibility of taking the program citywide.

- iv. Cast Study: The City of Chicago is partnering with two area non-profits to provide training in the selective dismantling of city-owned buildings. Proceeds generated from the sale of building materials are invested back into the program. Green Jobs Boston is a city-wide initiative coordinating a growing list of green job creation, training and placement efforts. It was created in partnership with the City's Workforce Investment Board, the Boston Private Industry Council. The types of areas it is concentrating on include:
- Energy Efficiency Technician and Weatherization Installation
 - Energy Auditor / Building Performance Institute (BPI) Certification
 - Green Facilities Maintenance
 - Green Heating, Ventilation and Air-Conditioning (HVAC)
 - Green Construction / LEED Certification
 - Remediation Technician
 - Green landscaping
 - Green Sales and Marketing
 - Renewable Energy (Concepts and Installation)
 - Bicycle Maintenance and Repair
 - Automotive Technician (developing hybrid modules)
- lvi. Case Study: Together, through a cooperative effort called the East Bay Green Corridor Partnership, the Cities of Berkeley, Oakland, Richmond and Emeryville are joining with leaders from UC Berkeley and the Lawrence Berkeley National Laboratory ("LBNL") to design a regional program that supports green workforce development. The goal of the effort is to provide the training necessary to meet future workforce demand in the green economy and to continue to attract green energy investment in the region. The partnership works collaboratively to identify regional employer demand and develop new technical and soft skills training and education programs to help meet that demand. The overarching vision is to have in place "Green Energy Education Pathways" that provide multiple entry points into the training and education system and that lead to jobs with career ladders and benefits.
- lvii. United States Congress, "H.R.6 Energy Independence and Security Act of 2007 (Enrolled as Agreed to or Passed by Both House 11. and Senate)," United States Government Publishing Office, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h6enr.txt.pdf; (Accessed May 1st, 2009)
- lviii. Raja, Samina, Branden Born, and Jessica Kozlowski Russell. 2008. A Planner's Guide to Community and Regional Food Planning. Planning Advisory Service Report No. 554. Chicago: American Planning Association.
- lix. A good example of a more comprehensive Urban-Agriculture Study is the "Alliance for Urban Agriculture" authored by MetroAg: (2010), Toronto Metcalf Foundation which identified five key areas: (1) increasing urban grower's access to growing spaces; (2) creating a better physical infrastructure for urban agriculture; (3) strengthening the local food-supply chain; (4) building a knowledge infrastructure among urban agriculture practitioners and stakeholders; and (5) creating new governance, coordination, and financial support models. Any final suite of recommendations will have to be based on an assessment of existing conditions.

- ix. Case Study: In June 2005, Mayor Jerry Brown's Office of Sustainability began evaluating each element of the food system in Oakland to provide baseline information with a goal of 30% local area food production. Five proposed goals guided this study:
- Goal 1: Food Security (Ensure that no Oakland resident experiences hunger. Ensure that access to safe and nutritious food is not limited by economic status, location, or other factors beyond residents' control);
 - Goal 2: Urban Agriculture and Waste Reduction (Maximize Oakland's self reliance and capacity to grow and provide healthy local food for its citizens);
 - Goal 3: Economic Development (Promote and revitalize economic development opportunities in the food sector that create jobs and recirculate financial capital within the community. Encourage marketing and processing practices that create more direct links between local producers and consumers;
 - Goal 4: Agricultural Preservation (Support the preservation of the region's foodshed by encouraging consumption of regionally grown food that uses less chemical and energy-intensive production practices and emphasizes local inputs;
 - Goal 5: Public Education and Capacity Building (Increase public "food literacy" and build capacity within communities to make food-related choices that positively influence public health and long-term sustainability).
- lxi. Case Study: The City of Philadelphia adopted a target as follows: "To help bring local food within a ten-minute walk of 75 percent of residents, Greenworks Philadelphia calls for the creation of 86 additional local food outlets by 2015. To increase this access city-wide, Greenworks Philadelphia calls for the creation of 59 food producing gardens, 12 farms and 15 farmers markets in Philadelphia.
- lxii. SAN DIEGO ROOTS Sustainable Food Project, is a network of citizens, farmers, chefs, gardeners, teachers, and students working to encourage the growth and consumption of regional food. From farm to fork, we focus awareness and work toward a more ecologically sound, economically viable and socially just food system in San Diego. ROOTS Works to:
- promote small, family farms and local food businesses
 - distribute information on farmers' markets and the seasonality of local food
 - provide education and resources on local food circles
 - encourage events that strengthen the local food system
 - protect and preserve farmland in San Diego County
 - grow our own food and help others who want to grow their own food
 - support school gardens and entrepreneurial youth training projects related to sustainable agriculture and the culinary arts.