Climate Change Plan
For
Orange County Government

Mayor Richard T. Crotty
and the
Board of County Commissioners

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FINAL

Table of Contents

1. Introduction

Orange County is committed to being a leader in reducing greenhouse gas (GHG) emissions, energy efficiency and environmental protection. In September 2005, Mayor Richard T. Crotty launched an initiative to promote energy efficiency and to register to become a Florida Green Local Government by 2008. Additionally, a goal was set to reduce petroleum consumption in Orange County by 20% over the next five years. In July 2007, the Board of County Commissioners adopted a Resolution to reduce GHG emissions. This new resolution will establish a target for reducing GHG emissions and project forecasts. These targets are essential both to foster political will and to create a framework to guide the planning and implementation of measures.

Orange County designated a county staff member and an elected official to serve as liaisons to the International Council for Local Environmental Initiatives (ICLEI), Cities for Climate Protection. ICLEI has a longstanding association of local governments working to address climate change and other sustainability issues. With the assistance of ICLEI, the County committed to conducting a baseline emissions inventory and forecast. Orange County has completed this inventory and it is discussed in later sections of this report. The next step is to develop a Local Climate Action Plan. This document is the first step in the development of the plan. Orange County's plan will describe or list the policies and measures that it will take to reduce GHG emissions and achieve our emissions reduction target. This plan will be fully developed to include a timeline, a description of financing mechanisms, and an assignment of responsibility to County departments and staff. This plan will incorporate public awareness and educational efforts. The development of the Local Climate Action Plan will include public input and involvement in order to build the consensus among stakeholders required to implement measures. Mayor Richard T. Crotty's Climate Change Summit is the first step in involving many of the community stakeholders.

Once the plan is fully developed, Orange County is committed to monitoring and verifying the results. Monitoring and verifying progress on the implementation of measures to reduce or avoid GHG emissions is an ongoing process. Monitoring begins once measures are implemented and continues for the life of the measures, providing important feedback that can be used to improve measures over time.

2. Background

Human activity has accelerated climate change and poses a threat to all living organisms. The Earth's surface and oceans are warming rapidly. Human burning of fossil fuels and deforestation are causing an increase in greenhouse gases in the Earth's atmosphere, and there is a broad consensus among scientists that this is driving unprecedented climate change. The consequences are dramatic, they are already underway, and the time to act is now.

At present, fossil fuel use is still widespread. Transforming of our global economy to be run on power sources that do not cause GHG emissions takes political will and time. Currently, major sources of these gases include electricity generation, transportation, manufacturing,

construction, and residential and commercial heating processes. The United States government presently has no regulatory framework to mandate reduction of GHG emissions. At the same time, regions are on the front lines of climate change impacts. If regional governments do not prepare for these impacts now, their residents and businesses will bear the incalculable costs of facing climate crisis after climate crisis for years to come. Given the potential for and likely impacts of climate change on future generations, poor planning or failure to start planning now would not be prudent.

It is true that a single government or agency does not have control over every action or strategy necessary to stop climate change or prepare for its impacts. However, a single government agency can and must collaborate with individuals, businesses, other agencies and other levels of government to implement lasting solutions.

Orange County sees this as an opportunity. While GHG emissions produced within the Orange County region constitute only a small percentage of national and global quantities, Orange County has a unique opportunity to demonstrate leadership on this global issue by pioneering the critical policies, practices and investments that will eventually drive reductions of GHG emissions in economies around the world. Orange County government recognizes its responsibility to help minimize and reverse these consequences, to be a leader for its citizens, and to provide support and encouragement to others throughout the country and the world. Orange County government and the Orange County region must do their part to slow, stop, and reverse the growth of global GHG emissions.

We do have a chance now to prevent the worst impacts of climate change. If we act effectively to reduce global GHG emissions and to prepare our region for the physical impacts of climate change, we should be able to limit both the magnitude of climate change and the severity of its impacts.

It is important to note that climate change action will have added benefits in other areas. A clean energy and climate friendly future benefits all communities, in terms of public health, jobs, and community engagement. Despite the many negative outcomes of climate change, action on climate change mitigation and adaptation can have additional economic, social and environmental benefits to the Orange County region.

Our actions to mitigate and adapt to climate change are expected to result in additional positive outcomes. Healthier air to breathe as a result of the use of alternative fuels means less respiratory disease; more physical activity through pedestrian-scale development and construction of active transportation infrastructure means lower rates of certain chronic diseases; greater economic stability for agriculture means better public health with robust locally-based food systems and food sources; and development of new markets means new jobs in clean energy and other related sectors. Water conservation efforts will help us not only adapt to future climate change, but also to take pressure off of water supply today.

It is clear that climate change is one of the most important challenges facing our world and region today, but our realization of the problem now represents a significant opportunity for change. Thus, this plan carries an even stronger message of optimism than a work plan

limited only to addressing the worst impacts of climate change. The vision behind this plan is one of a better future for the Orange County community, economy and environment.

3. Global History

The Earth's surface has experienced extraordinary and rapid warming -- about 1 degree Fahrenheit since the late 1800s. In recent years, temperature increases have been observed in regions across the world. Eleven of the last twelve years have been among the twelve warmest on record, and 2006 was the warmest year on record in the United States, according to the National Climatic Data Center.

To develop a scientific consensus about the cause and effects of this warming, the Intergovernmental Panel on Climate Change (IPCC) was convened by the United Nations in the early 1990s. The IPCC has since released several major "assessment reports" with the following conclusions, based on peer-reviewed scientific and technical literature. [1]

- On February 2, 2007, the IPCC released its Fourth Assessment Report, which stated with unprecedented confidence that human emissions of greenhouse gases are causing a rise in global average temperatures, as well as a cascade of other effects. It has been widely and authoritatively recognized, therefore, that climate changes being observed and predicted are not merely part of a cycle of nature. Human behaviors -- specifically fossil fuel burning and land use patterns such as deforestation -- are driving global warming and related climate changes.

- Based on direct observations, the IPCC February 2007 report stated that both air and water temperatures have shown evidence of warming, that ocean warming in particular has caused seawater to expand, contributing to sea level rise, and that warmer air temperatures have led to decline of mountain glaciers and snow cover in both hemispheres. In turn, widespread decreases in glaciers and ice caps (which do not include contributions from the Greenland and Antarctic ice sheets) have contributed to sea level rise.

- The IPCC February 2007 report also stated that many long-term climate changes have been observed, including "changes in Arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones (hurricanes and typhoons)." Widespread changes have also been noted in extreme temperatures, with "cold days, cold nights and frost [becoming] less frequent, while hot days, hot nights, and heat waves [becoming] more frequent."

These observed impacts have been different by places and times; they are not uniform. Regionalized predictions are thus critically important for local officials in crafting preparedness policies. This point is addressed in later sections.

4. Projections of Climate Change on Florida

According to most scenarios, continued human emissions of greenhouse gases at current and projected levels will lead to even more dramatic, potentially catastrophic changes in the natural climate patterns of the Earth. Given the continued rate of emissions and the atmospheric lifetime of those emissions, global temperatures are expected to rise and climate change is expected to worsen even if we stopped emitting greenhouse gases immediately and completely. Specifically, as reported by the IPCC in February 2007, a warming of about 0.2°F per decade is expected for the foreseeable future, and even if greenhouse gases had been "kept constant at year 2000 levels, a further warming of about 0.1°F per decade would be expected."

This statement means that the Earth's temperature is expected to rise another 3 to 10 degrees Fahrenheit by the year 2100 - a rapid and profound change. Moreover, as recognized by the IPCC, temperature change is already leading to a cascade of climate changes already in motion, including: reduction of snow cover; shrinking of sea ice; a "very likely" increased frequency of hot extremes, heat waves, and heavy precipitation events; a "likely" increase in intensity of future tropical cyclones (typhoons and hurricanes); and "very likely" increases in the amount of precipitation in high-latitudes.

Many of the changes described in that report will have—or are already having—disruptive effects on people's lives and safety, and our broader political stability and prosperity. In addition, scientists have already observed changes in Florida that are consistent with the early effects of global warming. These changes include retreating and eroding shorelines, dying coral reefs, salt water intrusion into freshwater aquifers, increasing numbers of forest fires, and warmer air and sea surface temperatures. Studies and evidence gathered by the National Oceanic and Atmospheric Administration (NOAA) and other scientists indicate that global warming is expected to make future hurricanes stronger, with "…significantly more intense rainfall, than under present day climate conditions." This expectation is stated on the "Global Warming and Hurricanes" section of NOAA's Geophysical Fluid Dynamics Laboratory webpage[2] and is "…based on anticipated enhancement of energy available to the storms due to higher tropical sea surface temperatures." In coming years, these effects may become more common, and increasingly severe.

Some of the potential effects of global warming that Florida may experience in the future were explained in a report entitled "Feeling the Heat in Florida: Global Warming on the Local Level,"[3] prepared by the Florida Climate Alliance and the National Resources Defense Council. These potential effects include:

- Coastal property and key tourist's resources damaged by sea level rise resulting from global warming. In addition, fresh water supplies, agriculture and tourist centers may be endangered by salt-water intrusion. Sea level rise, rising temperatures, and alterations in rainfall may also combine to harm coastal ecosystems such as the Everglades and coral reefs.

- An increase in heat-related illness and a possible increase in the incidence of infectious diseases. Senior citizens, one of the largest groups in Florida, are likely to be more susceptible to these effects.

- A negative impact on agriculture, commercial forests, and natural ecosystems. The extent of this impact is difficult to predict because of relatively large uncertainties in future rainfall and the potential for farmers and land managers to adapt to new conditions, but most scientists agree that a warmer climate means more intense weather systems, and heavier, more concentrated rains, along with longer droughts. These changes would likely result in a decrease of crop yields.

- Substantial threats to both life and tax base if hurricanes become stronger with more intense rainfall.

While much is known about global warming, there is a great deal that remains uncertain. Experts know that atmospheric levels of heat-trapping gases have increased, and the earth is warming faster than has ever been seen. More uncertain is the rate and magnitude of this trend for the future, and how it will affect feedback loops in the earth's atmosphere. The effect on these feedback loops could vary significantly, making future impacts even harder to predict. When the types and level of future impacts are so uncertain it makes it very challenging for countries and policy-makers to judge what steps to take, when to take them, and the level of commitments required.

5. Orange County GHG Emissions Inventory and Forecast Summary

Orange County has prepared an inventory of GHG emissions from its government operations. The GHG emissions levels shown here are gross estimates and do not include community contributions. Overtime, Orange County plans to incorporate overall community emissions into the inventory and work with the community on potential solutions. Orange County will refine and improve this inventory and develop the future community inventory.

The GHG emission inventory and forecast are a requirement for the County's Cities for Climate Protection Plan that Orange County has committed to develop. This inventory is being used to develop goals and plans for GHG reductions. It is anticipated that a GHG emissions inventory will become a requirement in future legislation. The Supreme Court recently declared the primary greenhouse gases pollutants to be regulated by United States' Environmental Protection Agency under the Clean Air Act.

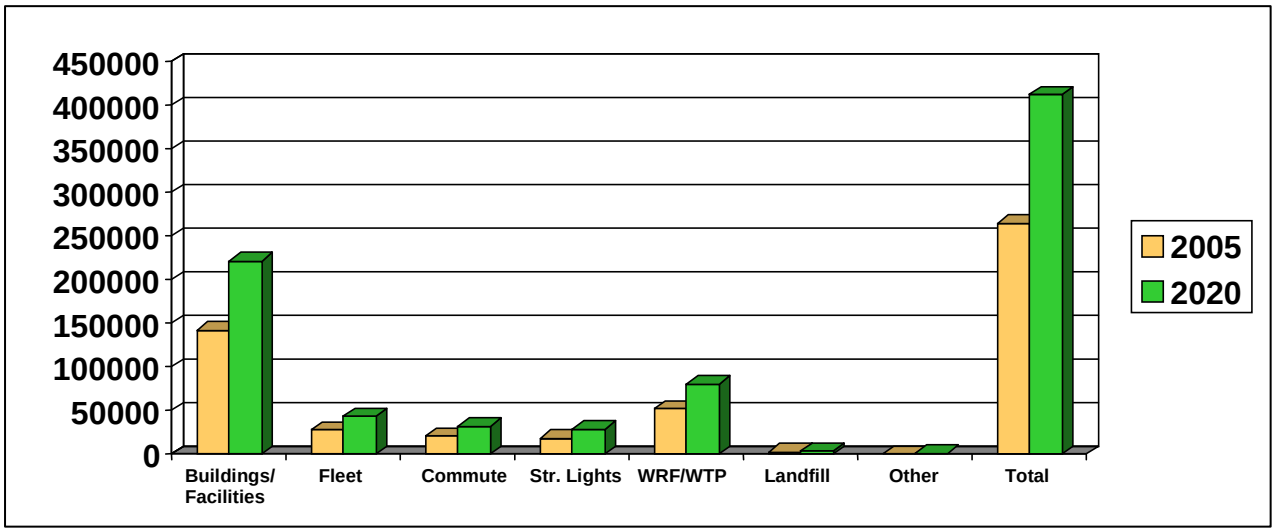
The GHG emissions inventory was developed by first listing all known emission sources and determining the energy and fuel usages, and municipal solid waste landfilled. The GHG emissions were calculated using the Clean Air Climate Protection (CACP) software from ICLEI. The software calculates GHG as tons per year (TPY) carbon dioxide (CO_2) equivalent. For example, one ton of CO_2 is approximately equal to the volume of the average house.

The CACP software evaluated the following sources:

- Buildings/Facilities (electricity, natural gas)
- Fleet (gasoline, diesel, biodiesel, etc.)
- Employee commute (gasoline)
- Streetlights (electricity)
- Water reclamation and treatment plants (electricity)
- Landfill waste (waste tons/yr, waste composition, methane capture efficiency)
- Other/Miscellaneous

Data was collected and most GHG emissions were determined from actual data (electricity and fleet fuel). The data from natural gas, employee commute fuel use and municipal solid waste landfilled was conservatively estimated. Sanitary landfills that capture and use their methane gas actually reduce the GHG emission calculations. However, since the Orange County Landfill is a municipal landfill, the analyses were not included in the county operation calculations but will be included in community-wide analyses. Next, the forecast was prepared by assuming 3% annual growth in county government, same as Florida's traffic count growth, resulting in 61% GHG increase over 15 years.

The graph below is a summary of the GHG emissions for Orange County government reported in tons.



Current GHG emissions are equivalent to 265,000 TPY CO_2. Further details on these calculations can be obtained from the Orange County Environmental Protection Division.

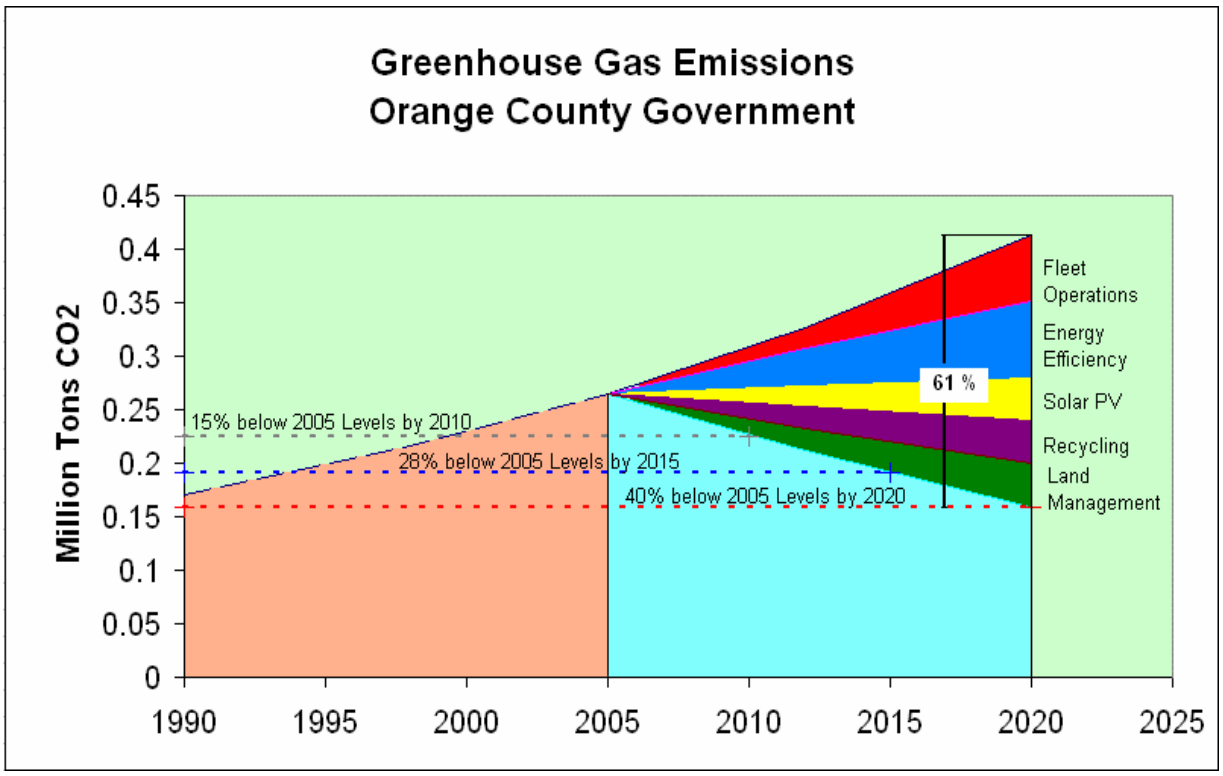
A better method is needed to track energy use for county-wide emission inventory. The forecast growth over 15 years is 61%, with no changes to baseline 2005 methods. County government needs to take the lead in reducing GHG emissions in Orange County emphasizing renewable energy, energy conservation, and efficiency efforts. The next step is to develop a plan to reduce growth in GHG emissions.

6. Orange County Targets

Orange County is setting the following targets for its Climate Change Plan. The reductions are based on 2005 GHG emissions.

- 15% reduction by 2010
- 28% reduction by 2015
- 40% reduction by 2020

The graph below shows the above-mentioned GHG emissions growth forecast over time if no actions are taken and our community continues to grow. The wedges represent the sectors in which Orange County government expects to reduce its GHG emissions.



7. Orange County Climate Change Protection Plan Goals

The goals below are some of the plans to reach these targeted reductions. Orange County has focused on activities that meet the following criteria:

1. Environmental practices done in-house to support GHG reductions;
2. Incentives and ordinances to foster green practices to reduce GHG; and
3. Educational activities to improve the environment.

Goal 1: Adopt policies to establish and implement a County Renewable Energy Initiative

Objectives:

A. Apply for grants and commit funds for solar photovoltaic (PV) panels at the Orange County Convention Center (OCCC). This, up to 1-megawatt, system could be the largest array of solar photovoltaic panels in the southeast. This will help the OCCC reduce their energy consumption from fossil fuel.
B. Develop a program to provide tax incentives and/or tax credits for solar energy manufacturers within the county.
C. Retrofit county buildings with renewable energy systems. This supports hurricane mitigation efforts to have decentralized energy available. Evaluate a specific goal of having 15% of power from all county owned buildings from alternative energy sources within 15 years.
D. All new county buildings meet the Leadership in Energy and Environmental Design (LEED) standards (originally established by Mayor Crotty in September 2005 commitments).
E. Partner with electric utilities to develop green power programs. Sell renewable energy credits (RECs) from the OCCC project to generate more alternative energy on county owned buildings.
F. Consider establishing an incentive program to increase solar hot water heater and PV panels on residential homes and businesses within the county.

Goal 2: Adopt policies to implement a Green Procurement Program

Objectives:

A. Develop procedures to ensure Orange County will purchase products that reduce toxic chemicals, reduce GHG emissions, support water and energy efficiency/conservation, are recyclable or made from recycled products and/or support renewable energy sources.
B. Ensure that life cycle economics is a consideration in purchasing products.
C. Consider allowing a 10% differential for products that are "green" as defined in Objective A.
D. Consider alternatives to water bottles at county events.
E. Require green cleaning (non-toxic cleaners) in all cleaning contracts upon renewal.
F. Ensure that all paper purchased for the county has a minimum recycled post consumer content of 35%. Also consider paper from alternative sources that are renewable.

Goal 3: Adopt policies to support Green House Gas Mitigation

Objectives:

A. Develop a program to mitigate official county travel. Create a fund used for local mitigation efforts such as tree planting and alternative energy.
B. Offer similar mitigation program at OCCC where conventions can chose to be carbon free. Funds would be used for county projects that support carbon mitigation.
C. Strengthen the Tree Protection and Removal Ordinance to remove some exemptions and increase replacement percentage of trees and consider canopy replacement criteria.

Goal 4: Adopt Educational Programs at the Community and County levels

Objectives:

A. Host regular workshops to discuss topics related to climate change such as smart growth, transportation, recycling, energy, etc.
B. Become certified as a Florida Green Local Government by winter. Share success stories to encourage other municipalities and counties to implement similar programs.
C. Convene the county internal Green Government Committee and monitor progress on initiatives.
D. Distribute periodic press releases on green topics to raise awareness.
E. Consider car-pooling and bus pass incentives; reduce tolls for carpoolers, preferential parking, etc. to encourage climate friendly commutes among employees.
F. Develop a fluorescent bulb pledge for Orange County employees to replace non-energy efficient bulbs and to raise awareness of energy conservation at home.
G. Encourage employees to have an audit done on their homes.
H. Create an educational program in energy management, GHG reductions and general environmental issues. Make this part of the new employee orientation program.

Goal 5: Adopt policies to support Recycling, Methane Recovery & Biomass Energy

Objectives:

A. Enforce and/or strengthen the commercial recycling ordinance.
B. Use OCCC recycling program as an example and implement in all similar operations.
C. Ensure all county building have recycling programs in place by the year 2009.
D. Promote residential recycling so that the current rate of 30 to 35% is increased to 50% by 2012.
E. Support continued methane recovery at the Orange County Landfill and ensure all new cells recover methane gases rather than flaring.
F. Support new technologies for generation of energy from garbage. Set up and encourage pilot programs when feasible.
G. Increase existing recycling goals for private landfills.
H. Help establish local markets for recycled construction materials.
I. Recover methane gas at county wastewater treatment plants or use other technologies to reduce GHG emissions.

Goal 6: Adopt policies to support GHG reductions in the Transportation Sector

Objectives:

A. Establish a target that 60% of all county vehicles will be either hybrids or use alternative fuel, by the year 2012.
B. Reduce vehicle miles traveled by using mobile technology in vehicles such as computer connections to office.
C. Reduce petroleum consumption by 20% by the year 2010 (goal originally set in September 2005).
D. Support mass transit and multimodal transportation centers.
E. Increase the number of miles of bicycle trails and roadside bicycle lanes.

F. Participate in a pilot program for plug-in hybrid vehicles.
G. Continue to support hydrogen projects as feasible, such as testing of the OCCC 12-passenger hydrogen buses.

Goal 7: Adopt policies to support Green Buildings

Objectives:

A. Commit to LEED certification on a minimum of three new county buildings. Train staff to become LEED certified. Certify a minimum of five county employees by 2009.
B. Support revision of the building code and/or energy code to support greater efficiencies. Support state effort and consider adopting local ordinance as needed.
C. Create incentives to support green building and green development, for private sector such as reduced fees, expedited permit review.
D. Continue to use green materials, especially in renovations, such as low volatile organic compound containing paints and coatings, carpets and carpet adhesives and composite wood, energy efficient light fixtures and mechanical systems.
E. Encourage all county sponsored or financially supported projects to build green.
F. Develop a program to reward water conservation. This could include creating water conservation credits when a new permit demonstrates less water will be used.

Goal 8: Formalize partnership agreements

Objectives:

A. Identify jurisdictions on a regional and even worldwide basis to partner in formal agreement to reduce greenhouse gases. Encourage local municipalities to develop local climate action plans to work together on this issue. Consider establishing a "sister" city in the United Kingdom to share ideas and plans.
B. Partner with various agencies that have the ability to support this Climate Change Plan and can assist in reducing greenhouse gases. Explore partnerships with Orlando Orange County Expressway Authority to encourage the use of alternative fuel vehicles and/or car pooling.

8. Conclusion

This is the first commitment for Orange County to begin to reduce GHG emissions. Orange County has been implementing energy efficiency measures for several years and has had a commitment since 2005 to reduce petroleum consumption.

This Climate Change Plan outlines goals for Orange County to evaluate and consider. This plan will be fully developed to include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments and staff. This plan will incorporate public awareness and education efforts.

Once the plan is fully developed, Orange County will commit to monitor and verify the results. Monitoring and verifying progress on the implementation of measures to reduce or

avoid GHG emissions is an ongoing process. At a minimum, targets and goals will be evaluated at least every three years.

Finally, the next step is to develop a community greenhouse gas reduction plan. Community involvement in this project is both necessary and desired.

Footnotes

[1] The content of this section is based heavily on a summary of the Intergovernmental Panel on Climate Change Fourth Assessment Report provided for policymakers, available at: http://www.ipcc.ch/SPM2feb07.pdf

[2] NOAA Geophysical Fluid Dynamics Laboratory webpage, Global Warming and Hurricanes Section: http://www.gfdl.noaa.gov/~tk/glob_warm_hurr.html

[3] Florida Climate Alliance & the Natural Resources Defense Council, Feeling the Heat in Florida: Global Warming on the Local Level, New York, New York, October 2001. http://www.nrdc.org/globalwarming/florida/florida.pdf