

The top portion of the page features a vibrant sunset scene with a line of palm trees silhouetted against the bright orange and yellow sky. The text 'City of Key West' is rendered in a bold, 3D, yellow-to-orange gradient font, tilted upwards from left to right, and positioned in the upper left quadrant of the image.

**City of Key West**

# **Climate Action Plan**

*October 1<sup>st</sup>, 2009*

## Executive Summary

Key West is one of the most vulnerable cities to the effects of climate change. Scientists suggest that escalating greenhouse gas emissions threaten to increase the Earth's temperature and raise sea levels. The City of Key West City Commission, observing high tides already at street level, has committed to take action here at home and to encourage the rest of the world to do so too.

It is widely accepted across the globe that carbon dioxide (CO<sub>2</sub>) and other greenhouse gases will have a progressively grave effect on the Earth's climate increasing the risk to municipal governments from extreme weather events, changing rainfall patterns, and even the migration of infectious diseases. Research shows that the combustion of fossil fuels releases greenhouse gases (GHG), namely carbon dioxide, and that organic waste releases methane gas, another more destructive GHG, into the atmosphere causing global surface temperatures to increase with related rising sea levels. The impacts on the city vary from reducing habitat for native species to less economic growth.

Local governments share a common duty to improve the quality of life of their citizens. Policies implemented by city governments affect the economic, environmental, and social conditions within the city so it is imperative that those policies are effective and suited to the particular city. Committing the city to action upon his election, Mayor Morgan McPherson signed the Mayors Climate Protection Agreement and on August 7, 2007 the City Commission passed resolution 07-160 committing to use the 5-milestone process to reduce carbon emissions. August 5, 2008, the Key West City Commission passed Resolution 08-067 setting the goal of reducing community greenhouse gas emissions by 15% of the 2005 levels by year 2015, directing staff to reduce municipal emission by 15% and directing staff to create a community climate action plan. This step toward a sustainable future is a leadership role amongst local governments which will surely help bring action here and encouragement to other communities which possibly may be less immediately affected by climate change. Key West, having an average elevation of about 2 feet above recent high tides, will be significantly impacted if GHG emissions are not reduced.

As a result of the Commission's Resolution, Environmental Programs Division was directed to work with the community to develop an action plan to serve as a roadmap to Key West's emissions goal. Community members were recruited to work diligently to develop a plan that is achievable through business, resident, and government agency action. The plan identifies projects, their efforts, costs, and benefits. The following plan will reduce or offset carbon emissions from 400,000 to 340,000 tons. The five major action areas are:

- Energy Supply -Reduce 9831 tons per year of CO<sub>2</sub>e emissions;
- Solid and Sewage Waste – Reduce 7,055 tons per year of CO<sub>2</sub>e emissions;
- Transportation – Reduce 12,681 tons per year of CO<sub>2</sub>e emissions;
- Building Efficiencies – Reduce 30,258 tons per year of CO<sub>2</sub>e emissions; and
- Sustainability/Sequestration – Absorb 175 tons of CO<sub>2</sub> per year.

This Plan is expected to be implemented through 2015, while actions are monitored, measured and improved annually. The mid-term goals from 2015 through 2025 and long term goals through 2050 are expected to be developed by future action teams.

We would like to thank the many dedicated community and city government volunteers for their assistance in preparing this plan or providing much needed input. It will take the entire community to meet our goals and the dedication of the individuals who continuously provide input and support to community boards and committees will help ensure the goals are realistic and achievable. We have attempted to acknowledge everyone here but may have erroneously omitted a contributor, and apologize to any who were.

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## **1.0**

# **INTRODUCTION**

### **1.1**

#### **The Science of Climate Change**

It is a well-researched fact that the combustion of fossil fuels releases greenhouse gases, namely carbon dioxide (CO<sub>2</sub>), into the atmosphere. In a series of lengthy reports, the Intergovernmental Panel on Climate Change (IPCC) found that atmospheric CO<sub>2</sub> levels are increasing at an unprecedented and alarming rate due to human consumption of fossil fuels. As a result, the mean global surface temperature has risen during the last century. This increased temperature contributes to rising sea levels, more intense weather events, habitat disruption that could lead to species extinction, and other possible serious effects. It is unknown how successful humans, plants and animals will be at adapting to these relatively rapid changes. While how much the climate is warming, what effects can be predicted, and to what degree humans are responsible are avidly debated and research questioned, the vast majority of scientists agree that it is time to take strong precautionary measures to stabilize greenhouse gas emissions and slow global warming.

A carbon sink is a natural or manmade reservoir that accumulated and stores some carbon chemical compound for an indefinite period. The main carbon sinks are photosynthesis of algae and plants and absorption of CO<sub>2</sub> by the oceans. Photosynthesis is a process that converts carbon dioxide into organic compounds using the energy from sunlight. Photosynthesis uses carbon dioxide and water releases oxygen as a waste product. Some carbon is stored in soils. The carbon in the oceans dissolve and in doing so creates a variety of compounds. IT is surmised that ocean acidification is occurring due to volume of CO<sub>2</sub> being absorbed into the water.

In addition to carbon emissions themselves, additional greenhouse gasses remain in the atmosphere due to accelerated deforestation worldwide. The reduction of forests reduced photosynthesis which in turn reduces the volume of CO<sub>2</sub> removed. This is especially true of salt water marshes, including mangrove habitat. Marshes are the best carbon sink of all natural sequestering options. Soil in Northern climates store large amounts of carbon. As these climates are seeing less frost, the carbon sink is decreasing.

### **1.2**

#### **Natural Warming**

Energy from the sun radiates into the Earth's atmosphere and is absorbed into the Earth's surface, much of it radiates back into space, especially at night; this heating creates weather and climate. Some of this energy is trapped by naturally occurring greenhouse gases such as carbon dioxide and methane. GHGs are a necessary to keep the earths temperature relatively steady. As the concentration of GHGs continues to increase in the atmosphere, the Earth's temperature is

quickly rising above levels expected in such a short time frame. U.S. National Oceanic and Atmospheric Administration records indicate the Earth's average surface temperature has increased by about 1.2 to 1.4° Fahrenheit in the past 100 years. Eleven of the twelve years from 1995-2006 rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850), with the warmest year being 2005. IPCC Fourth Assessment Report "Climate Change 2007: The Synthesis Report"

### **1.3**

#### **Earth's Climate is Affected by Human Activity**

The Bush White House asked the National Academy of Sciences (NAS) to assess the scientific conclusions regarding climate change and projections of future change. The NAS report, *Understanding and Responding to Climate Change (2008)*, stated, "Climate changes observed over the last several decades are likely mostly due to human activities...and additional evidence collected over the past several years has increased confidence in this conclusion."

Some GHGs in the atmosphere is a natural part of the Earth's climate system and is beneficial to our environment. However, extensive combustion of fossil fuel and reduction of the world's forests over the past few hundred years has caused higher greenhouse gas concentrations in the Earth's atmosphere. GHG concentration has increased 70% since 1970. Twenty-four percent of this increase occurred between 1990 and 2004. Vehicular and electric power plant fossil fuel consumption along with deforestation resulted in 7.1 billion metric tons of CO2 emissions yearly.

Although there is great uncertainty on the exact increase in temperature and sea level rise and the timing of it, even among the scientist of the IPCC, climate models do predict and the scientists agree, there will be an increase in the Earth's surface temperature from 2.5 to 10.4° F by 2100 if emissions are not mitigated. The IPCC scientists are certain that human activities are changing the composition of the atmosphere and that in turn will cause other effects. The scientists agree one effect will be sea level rise.

Local and state governments can have a large impact on climate action. The President's Secretary of Energy, Steven Chu, lauded California "California has kept its emissions constant since 1970 while the rest of the US has increased their emissions by 40%."

## **2.0**

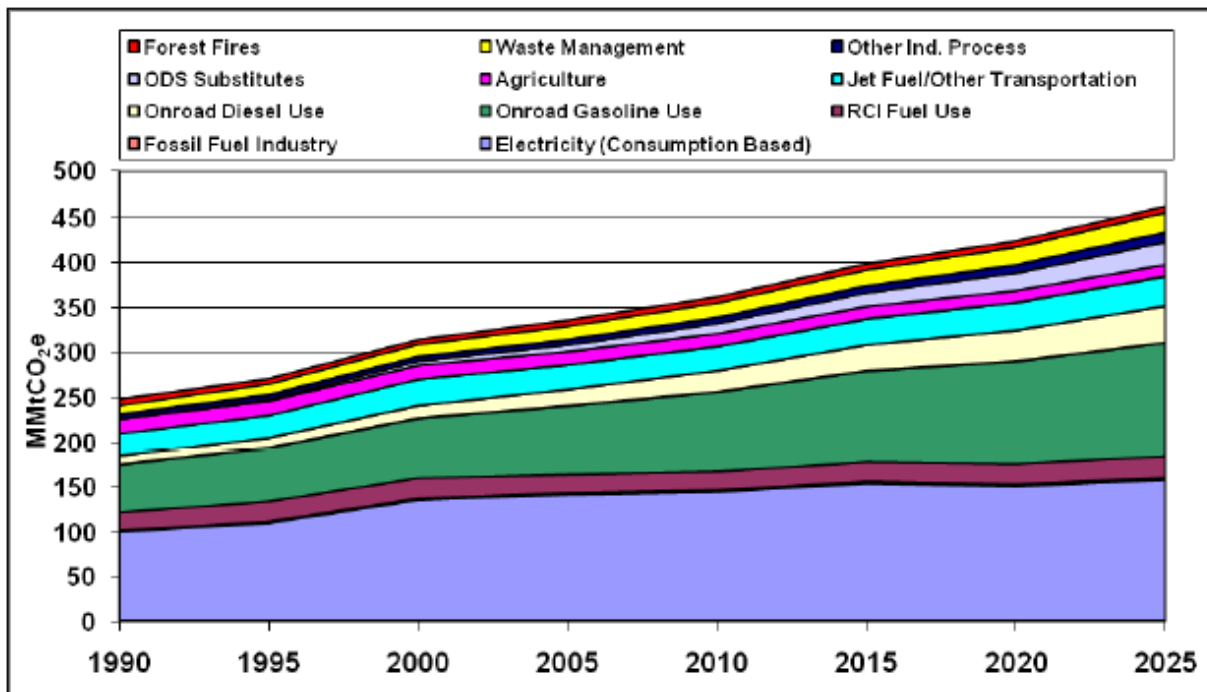
### **Florida's Emissions of Greenhouse Gases**

In 2007 Florida Governor Charlie Christ created the Governor's Action Team on Energy and Climate Change to develop a series of recommendations for addressing climate change in Florida. A summary of the findings relating to climate change and the potential impacts on Florida is provided below. The team found that "There are numerous benefits, both environmental and economic, which accrue both to the State of Florida and the private sector, due to pursuing energy efficiency and investing in alternative energy technologies; with planning

these may be able to override the negative impacts of climate change.”\* \*Florida Governor’s Action Team on Energy and Climate Change Final Report

In order to complete Florida’s Energy and Climate Change Action Plan the FDEP and the Center for Climate Strategies prepared a state inventory and projections of GHG emissions. The plan stated “While climate science is complex and evolving, the scientific community has reached a strong consensus that warming is largely the result of carbon dioxide and other GHG emissions from human activities.” Florida’s emissions since 1990 are expected to almost double by 2025. Florida GHG emissions for transportation and electric emissions account for 81% of the states emissions.

The table below is an excerpt from the state plan.



\*Florida Governor’s Action Team on Energy and Climate Change Final Report

**Figure 1 Actual and Projected Greenhouse Gas Emissions in Florida by Sector, 1990-2025**

It is clear from the reports of the IPCC and the Governors Action Team on Energy and Climate Change that all Floridians should take action to reduce GHG emissions in an effort to minimize the subsequent climatic effects.

The State Action Team reported the impacts on Florida will include among other changes:

- Air temperature rise of 2.5 to 10.4 degrees Fahrenheit
- Sea level rise between 4 and 35 inches which could inundate wetlands and low lands
- Precipitation changes
- Tropical cyclone changes

- Decreased freshwater resources
- Increased sea water temperatures affecting fisheries and corals
- Increased ocean acidification affecting shellfish

Left unmitigated, Floridians will contribute to the very dangerous rise in sea level. By most nations acting immediately to reduce emissions the world may be able to avoid or minimize the negative effect of GHGs. Floridians can be encouraged into climate action through a cap and trade system, taxing energy or emissions, and other market-based solutions. Florida's Action Team recommended a regulatory, market-based cap-and-trade emissions limiting program that will be able to urge public and private sector to invest in new technology, and better construction which will stimulate economic development.

Florida's Governor's Action Team on Energy and Climate Change October 15, 2008 Phase 2 report contains over 50 policy recommendations and recommends the legislature "work to encourage the development of alternative energies to achieve the goals of:

- Mitigating the potential impacts to Florida from climate change;
- Further stimulating economic development in the state associated with the existing and emerging alternative energy industries; and
- Achieving energy security by reducing dependence on foreign fuels."

### 3.0

#### *Key West Greenhouse Gas Emissions*

ICLEI Local Governments for Sustainability, founded in 1990 is an international agency of over 1105 agencies. ICLEI USA, was launched in the United States in 1995 and has grown to more than 500 US cities and counties providing leadership on climate protection and sustainability development. It was formed of local governments to assist local governments in developing sustainable and practical solutions to global environmental problems. The ICLEI Cities for Climate Protection (CCP) Campaign focuses on global warming and climate change. CCP is a performance-oriented campaign that offers a framework for local governments to reduce greenhouse gas emissions and improve livability within their municipalities. The CCP Campaign achieves these results by linking climate mitigation with actions that improve local air quality, reduce local governments' operating costs, and address other existing municipal concerns.

The CCP Campaign involves a five-milestone process to achieve GHG emissions reductions:

- Milestone One: Conduct a baseline emissions inventory and forecast.
- Milestone Two: Set an emissions reduction target.
- Milestone Three: Develop a Local Action Plan for reducing emissions.
- Milestone Four: Implement policies and measures.
- Milestone Five: Monitor emissions reductions and verify results.

On August 7, 2007, the City of Key West adopted its resolution for climate protection and officially joined ICLEI's Cities for Climate Protection Campaign. This Climate Action Plan sees the City achieving milestone three of the process. A copy of the baseline inventory is

available in the appendix and on the City website under the Clean and Green portal which can be found at: [www.keywestcity.com/department/board.asp?fDD=21-312](http://www.keywestcity.com/department/board.asp?fDD=21-312)

The inventory is based on accepted international protocols and keeps with a similar approach other cities with climate change objectives have used. It is not meant to be precise GHG accounting, but it does provide a high level examination of the City’s GHG emissions. Utilizing the results of the Inventory enables the City to develop policies and programs that will create the greatest emissions savings.

The Key West emissions inventory was completed in 2008. The inventory’s baseline year is 2005; 2007 provides an interim measure. The report indicates that the City of Key West community produced 399,592 tons of carbon dioxide emissions, equating to 16.7 tons of GHG emissions per capita for the city. A forecast of predicted emissions unmitigated by 2015 is 416,826 tons CO2e.

The top energy user in the city is the US Navy emitting about 45,000 tons of CO2e. The remaining top ten emitters are the Monroe County Detention Facility, the City of Key West, the hospital and college, as well as 4 hotels and one grocery store.

To put the use of energy in a very basic level US Dept of Energy Secretary Steven Chu, a Nobel Prize winner for physics, described America’s energy use in units of caloric energy this way; "every person in the United States uses energy as if they had 100 personal servants at their beck and call” to clean, transport, and cook daily.

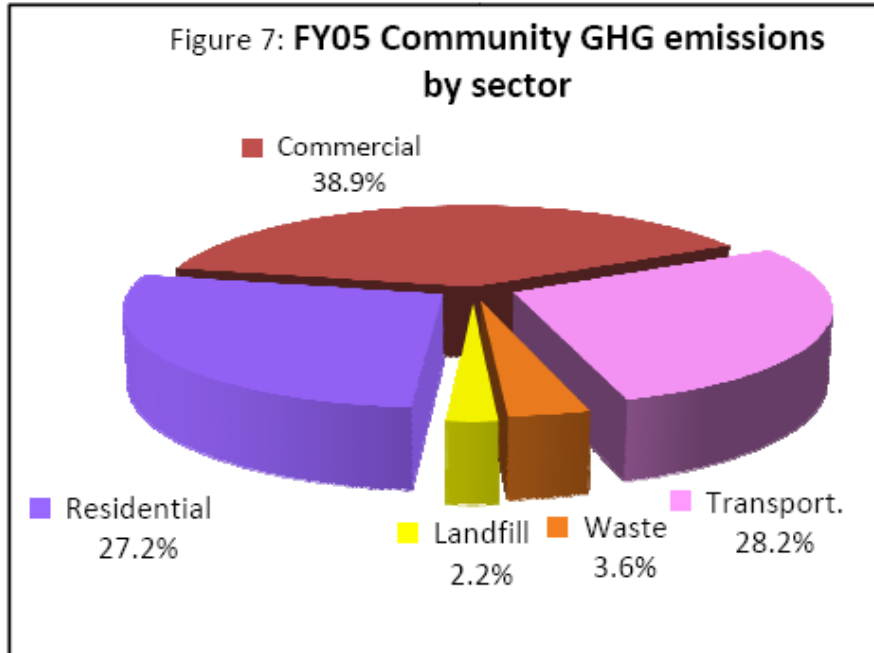
Keys Energy Services, Key West’s electric provider obtains its electricity though the Florida Municipal Power Agency (FMPA). The FMPA purchases its energy from a variety of sources. Seventy percent of the power is derived from natural gas. Smaller percentages are coal and oil, with a slight purchase of nuclear, and shortly, solar will be added. Natural gas produces much less GHG than coal or oil.

The following table summarizes GHG emissions:

**GHG Emissions by Sector – Key West 2005**

<b>Sector</b>	<b>Percent</b>	<b>TONS CO2e</b>
Residential	27.2%	108,689 tons
Commercial	38.8%	155,322 tons
Transportation	28.2%	112,492 tons
Waste	3.6%	14,260 tons
Landfill	2.2%	8,800 tons

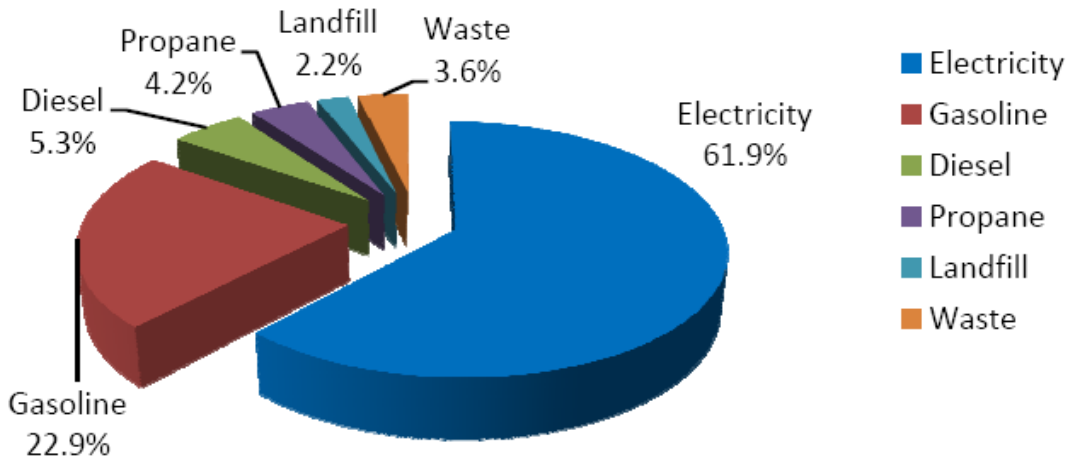
**Table 1 - GHG Emissions by Sector – Key West 2005**



Excerpted from City of Key West Green House Gas Emissions Inventory January, 2008

**Figure 2 – FY05 Community GHG Emissions by Sector**

**Figure 12 - FY05 Community Inventory by Energy Source**



Excerpted from City of Key West Green House Gas Emissions Inventory January, 2008

**Figure 3 – FY05 Community Inventory by Energy Source**

## 4.0 **KEY WEST CLIMATE ACTION PLAN**

This plan aims to identify potential projects of relevance to Key West and explore some possible financial and environmental impacts of proposed initiative. The overarching vision of the plan is to develop a sustainable energy future for Key West. It includes baseline data and emissions reduction strategies for all sectors – commercial, residential, public/federal, transportation, and solid waste. It also addresses city operations, water conservation and urban forestry.

The City's primary role will be to act as a facilitator, educator, and to promote market transformation for energy efficiency and renewable energy products and services. The plan outlines five primary strategies for reducing emissions: increase energy efficiency of buildings; reduce waste related emissions, reduce transportation related emissions, improve energy transmission/increase renewable energy options, and increase carbon sequestration. Each section outlines overarching strategies and potential actions the City and community are encouraged to take to reduce emissions. The plan concludes with an implementation plan that outlines specific actions to be implemented from 2009 through 2015 (with recommendations for funding, maintenance, and improvement) and quantifies the projected impacts, including estimated GHG reductions, private sector savings and the net cost per ton of carbon dioxide equivalents (CO<sub>2</sub>e) reduced.

The annual total budget for the City of Key West Government required to achieve this reduction ranges from \$144,000 this year in mostly existing staff salaries to 1.7 millions in 2013 to fund alternative energy products. The plan assumes that funds for marketing, outreach, energy management and subsidies for critical services, such as energy audits, will comprise the majority of the operations budget. Capital expenses are required, however all have very positive returns on investment and grant opportunities are available. Significant funding for renewable energy purchases may be required in 2015 to cover an emissions reduction shortfall, thereby increasing the amount of funds needed in 2015 as compared to the average annual budgets for years 2010 to 2014.

Achieving the Key West goal requires not only a substantial financial commitment, but also the dedication of staff resources and political will. While the City recognizes that Key West's actions are far too small to impact global greenhouse gas emission trends and the progression of global warming, Key West *is* one of the most affected cities in the country.

The creation of this Local Climate Action Plan outlines the policies and measures recommended to enable Key West to achieve its 15% by 2015 reduction on baseline 2005 levels. This plan will need to be fully developed into an implementation plan to include a timeline, a description of financing mechanisms, and an assignment of responsibility to City departments and staff as well as other government agencies, business groups and community organizations. Cost estimates depend on what options are chosen to bring the community to the emissions reduction goal. Different options require different levels of investment. For example, implementing a wide array of energy efficiency measures would require significant amounts of capital, but also produces a return on investment, creates jobs, and institutes long-term improvements in the environment.

However, energy efficiency alone is unlikely to reach the goal. The City could also choose regulatory approaches that cost relatively little to implement and achieve full market penetration. While no regulatory strategies are being proposed for immediate implementation, the Climate Action Team has recommended that the options presented in the plan be considered in the future. It is likely that a combination of these options will be needed. This plan, as well as the implementation plan recommendations, attempts to assist staff in developing the appropriate mix of strategies and investments.

#### **4.1**

##### **Criteria and Recommendations**

In analyzing the wide variety of options available to reduce greenhouse gases, the Climate Action Team, made up of members of the public, utilities, commerce, tourism and local government agencies, applied the following criteria to their process of review and deliberation:

**Viability** – Is the proposed action financially, technologically, and politically viable?

**Cost-effectiveness** – Applying full cost accounting principles, as the distributions of costs and benefits equitable and reasonable?

**Implementability** – Is there a readiness to implement and are the potential barriers to implementation low?

**Achievement of goals** – Does the proposed action contribute to short and long-term reduction goals? Is there a cumulative impact over time?

**Engagement** – How can the impact potential of the proposed action be balanced with the potential for public engagement and education?

This plan draws two broad visions of the future; the first is for our business community and the second for our residential community. Each vision is made up of various components from the specific five target priority areas the CAT recommends to reach the 2015 Goal and also highlights areas to be targeted through educational efforts to assist residents and businesses to make relatively simple and affordable changes with long-term cost savings and reduced carbon emissions.

## **5.0**

### **The Vision**

The vision of the Climate Action Plan (CAP) is to guide Key West towards a sustainable future that dramatically reduces greenhouse gas emissions from current levels, while meeting the needs of present and future generations. Strategies presented in the CAP include increased energy efficiency, waste diversion, alternative transportation, building efficiencies, and sustainability/carbon sequestration. A report completed for the Sierra Club titled “Sustainable Cities: Best Practices for Renewable Energy and Energy Efficiency” by Ken Regelson, October, 2005 identifies the following key elements cities are using to become more sustainable:

- Leadership
- A Plan
- Efficiency Rebate -Programs
- Renewable Programs

- Funding
- Green Building
- Communications
- Multifamily Building Programs
- Training
- Income Qualified Programs
- Inspections, Audits, and Measurements
- Green Roofs

A summary of key findings drawn from four cities across the United States emphasized:

*Leadership* – most often the original impetus came from a mayor or commissioner.

*A Plan* – All had a master plan or roadmap to follow.

*Funding* – Funding for energy efficiency (EE) and renewable energy (RE) came from electric power rates, grants, state programs, and integration into normal city budgets. Investments lead to reduced energy costs.

*Communications* – Excellent websites include details on programs, customized fact sheets (e.g., on green building practices), reports, and case studies. All had award programs or on-line show cases for excellence in green building.

*Training* – Rather than emphasize EE and RE as topics themselves, resident and business training often focused on the human concerns of saving money, or sealing leaks for comfort, or on indoor air quality and health.

*Inspections, Audits and Measurement* – Free or low cost energy audits and inspections are provided. Measurements and analysis help insure that RE and EE investments are cost-effective and popular with residents. Commissioning of buildings verifies that RE and EE equipment is installed and operated properly.

*Efficiency Rebate Programs* – There were often targeted to specific reductions in peak electricity use, with efficiency rebates set as a fraction of the projected cost of building the next power plant.

*Renewable Programs* – Include both green energy purchasing programs and rebates for resident sited solar.

*Green Building* – Lead by example. Start with city-owned buildings to develop local expertise. Green building was then encouraged generally with assistance, rebates, grants, award programs, and some regulation.

*Multi-Family Building Programs* – Focused on the needs of renters and apartment owners.

*Income Qualified Programs* – Recognize that low income residents most need the comfort and money savings from EE, but can least afford it, so additional incentives for EE are provided.

*Green Roofs* – Chicago and Portland have green roof programs for the benefits of energy savings, urban heat island reduction, rainwater retention, air quality improvement, and beautification.

While the City recognizes that Key West's actions are far too small to impact global greenhouse gas emission trends, it also recognizes that the cost of inaction could be very high and that inaction represents a missed opportunity for saving money (costs of delay) and improving the economic environmental and social sustainability of the community. A sustainable energy future means the following changes for Key West:

- More efficient and healthier buildings that reduce community energy costs;
- Keys shuttles conveniently linking different neighborhoods and business districts;
- Wide availability of sustainable products, including green building materials, high efficiency building equipment and cars, alternative fuels, organic food, community composts, and more;
- Renewable energy and distributed generation systems to hedge against energy price volatility and electricity system vulnerabilities;
- Innovative, social programs ensuring that lower-income residents benefit from the shifts and changes brought about by the CAP;
- A vibrant economy and skilled workforce based on the demand for and provision of sustainable products and services; and
- An even stronger sense of community pride in Key West’s efforts to protect the environment from the impacts of global warming.

## 6.0

### **Program Recommendations**

The following recommendations, if fully implemented, will demonstrate Key West’s commitment to addressing the problem of global warming by reducing greenhouse gas emissions by 15% by 2015 using 2005 baseline data. The current city-wide emissions are about 400,000 tons CO2e annually. Therefore the 15% reduction goal is a reduction of 60,000 tons of CO2e.

#### 6.1

##### **Energy – Key West will reduce annual greenhouse emissions by 10,731 tons by using renewable energy, conservation, and more efficient power.**

1. Replace standard street lights with Solar LED lighting - 986 tons
2. Replace old fashioned lights with LED lighting - 540
3. Install LED lighting and solar generation system at City (Park n Ride Garage) -130 tons
4. Install alternative energy systems:
  - a. Wind energy generator at Waste Water Treatment Plant (WWTP) and land fill - 500 tons;
  - b. KES/FMPA/NOAA solar project, (37kw)
  - c. KES/FMPA/NOAA wind project (6kW capacity)
5. City Commission to Partner with Utility Board of the City of Key West to develop a series of goals, timelines and benchmarks to reduce emissions by 6,814 tons CO2e through:
  - a. enhanced program of purchasing electric power generated by low co2 emission fuels and non-combustible energy
  - b. Energy demand or tiered/inverted rate incentive program to encourage conservation and fund improved energy audits or utility “green energy improvements”.
  - c. Encourage Keys Energy Services to continue to consider “smart grid” and “smart meter” systems.
  - d. Encourage continued improvement of transmission and distribution systems to reduce line losses.

e. Partner in rebate and marketing program to promote conservation as cost effective “climate action”.

6. Consider the advantage of taxing electric utility and propane use to encourage conservation; dedicate funding for a revolving loan fund for weatherizing and renewable energy projects. Tax at a level that simple conservation at the desired level will not increase current/expected rates. (note, increased cost during this economic climate may not be feasible by 2015)- (900 tons).

7. The City of Key West will monthly publish in a local newspaper the current and previous 24 month electric consumption by the City of Key West government in order for the citizens to judge the progress towards reducing consumption.

8. The Utility Board shall monthly publish in a local newspaper the current and previous 24 months the total and per customer electric consumption by all residences and businesses in order to for the citizens to evaluate progress towards the goal of reducing consumption.

## 6.2

### **Sewage and Solid Waste and Water Supply – Key West will reduce waste and water supply greenhouse gas emissions by 7,055 tons through water conservation, system conservation, alternative waste disposal and modified waste contracts**

1. Establish multiple commercial recycling and waste vendors to increase competition and improve services. Ensure contracts have performance measures and quarterly and annual performance reviews.

2. Implement a pay as you throw trash initiative to incentivize composting, recycling, reducing and re-using.

3. Create a “solids” composting system for the waste water treatment plant and a composting system and mulch program for organic solid waste.

4. Implement an energy efficiency program, or ESCO for the waster water treatment system.

5. Partner with the FKAA to implement a reclaimed water system reducing the need for pumping fresh water from the mainland.

6. Partner with the FKAA to create a coordinated water conservation program.

"We have saved 40% of our waste costs by reducing, reusing, composting and recycling; that is an annual savings of \$8,640" - Cindy DeRocher, General Manager, The Gardens Hotel.

## 6.3

### **Transportation - Key West will reduce green house gas emissions by 12,681 tons by reducing vehicle miles traveled, conservation and increasing alternative transportation use.**

1. Implement the full Bicycle/Pedestrian Plan as approved by the City Commission, along with recommendations listed in the actions section of this plan including curb cuts, safe sidewalks, increase bicycle parking and bike racks at every lower keys shuttle bus stop.

2. Establish sub-committee as an authority to oversee private and public sector assistance in promoting and enabling people to use alternatives to the car; carry out surveys of bus users and non-users and whether commercial interests could assist in promoting public transport such as “free pass to shop” at grocery outlets, employee incentives (the US Navy provides public transit passes to military and civilian employees),and pay not to park programs.

3. Promote “green” and “Smart Fleets” through incentives, driver training, creation of alternative fuel stations. Lead by example through greening of the city bus and vehicle fleet; commission a benefit analysis of using propane for local busses.

4. Promote car pooling, car pool website and electric car stations at all city parking lots; ensure public transit system has bus route timing that encourage commuting to work and back home.

5. Improve bus ridership through minor improvements including a simple to read map and schedule to be posted and maintained at every bus stop, shade, ADA access and weather protection at stops, a marketing campaign and improved bus pass and fare sales.

6. Require special events receiving permits from the City Commission to include a plan to promote transit, pedestrians, bicycles and shared rides. Such a plan would include alternative modes of travel in event publicity, providing additional bicycle parking, provide satellite locations for people to park and ride transit and adding temporary transit service to meet additional demand.

#### **6.4**

##### **Buildings - Key West will increase energy efficiency of commercial, residential and government buildings to reduce 30,258 tons of green house gasses.**

1. Hire a professional energy manager to work for city to develop energy efficiencies in all city-owned buildings, then assist the remaining top 10 electric users in energy efficiency measures, then work with commercial and residential users. Develop partnerships with all large electric users including Naval Air Station Key West.

2. Create an outreach program to reach every resident and business manager and educate them in using simple clear actions that will save money and reduce greenhouse gas emissions.

3. Implement green office audit for all City owned buildings with milestones, goals, and timelines – develop recognition system for staff. Share audit program with other public agencies.

4. City to create incentives if a permittee or developer uses alternative power, like increased density, reduced parking requirements, fast permitting, etc.

5. Implement ordinance to encourage building energy efficiency improvements in leased spaces, and request that all large building owners consider commissioning studies or an energy savings performance contracting program.

6. Create an alliance of city staff, contractors, planners, architects, engineers, the Monroe County Extension Service, FKCC and educators to encourage energy efficient building and renovations and institute contractor/designer/owner training programs.

7. Require all affordable housing to be green building certified by a recognized certification process (i.e. LEED) which will reduce monthly energy costs of tenants or owners on a continuing basis.

“In the two years since we opened our Personal Training Center, our efforts to go green have helped us save approximately \$9,000 per year. Most projects gave us a positive cash flow within 90 days and the long term projects will pay off for more than 20 years. Our business is a classic example of how small companies can use green ideas to improve their customer experience, save money and the environment all at the same time.”

Dan Reynen -  
WeBeFit.com

#### **6.5**

##### **Sustainability/Sequestration – Key West will reduce 1000 tons of greenhouse gasses through better land use planning, and increase the sequestration of 175 tons of carbon dioxide**

1. Create a non-profit organization for the planting and maintenance of 10,000 trees, mangroves and other landscaping in Key West. This will provide for a reduction of the city's "heat island" effect an increase in shade on homes and businesses which reduces cooling bills, and an increase the walk-ability of the city.

2. Establish a certified "Carbon Offset" fund program for home and business owners, event organizers and visitors that accepts donated funds for the tree planting, operated by a non-profit agency and marketed by the City and agency.

3. Promote special events such as "carbon neutral" and "earth friendly" by incentivizing them through the City permitting process. Carbon neutral events may reduce their carbon footprint and then donate to a certified carbon offset fund, like the proposed tree planting fund, to create a neutral event.

4. Use "Smart Growth" principals for all developments and re-developments in Key West. Actively encourage the extensive use of green building techniques in all renovations and new construction.

5. Impart island pride and the ability to take action in every citizen, worker and visitor in Key West through continued marketing, education and outreach to all; apply the principles of total quality leadership to promote continuous commitment to improving the local environment and quality of life. The city and all its associates should serve as role models through deed and words.

6. The City of Key West Planning and Building Departments will promote and suggest energy conservation measures when reviewing new developments and redeveloped properties such as shading buildings with native vegetation, adopting building shapes and orientation to reduce heat gain, shading parking lots with native vegetation around buildings, using white roofs to reduce heat gain, and providing more insulation than the minimum to requirement.

7. The City of Key West will revise the Architectural Guidelines in the Historic District to accommodate white roofs, wind power, solar electric panels and solar water heaters.

"At MCC, we strive to be a completely 'polystyrene-free' venue. In this way, we not only live out the principles of being 'green' but we ask those who use our space to do the same out of respect for our philosophy and the principles we hold dear. This measured approach simultaneously educates and encourages our sister-organizations (and all the individuals therein) to adopt these and other changes that may seem small, but ultimately impact the entire community in very substantial ways."  
- Joe Mc Murray, Pastor

## 7.0

### *Operational Recommendations*

The CAT is eager to see the City take a lead in implementing the above recommendations and would suggest tasking a full time "green coordinator" or "sustainability manager" to oversee and report on progress towards achievement of goals and initiatives. This would both avoid duplication of effort as well increase effective planning and evaluation of each element of the plan. The coordinator would work closely with residents, commerce, public and not-for-profit agencies to extend educational awareness initiatives and act as a "one-stop shop" contact point for all enquiries.

## 7.1

### Key Educational Points/Responsibilities for Green Coordinator

An overarching educational plan is recommended as a way of obtaining economy of scale discounts on marketing and advertising costs. It is vital to enter partnerships with other community and government agencies to adopt a holistic approach to greenhouse gas reduction. Organizations that will be key to the success of the plan will include the Florida Keys Aqueduct Authority, Keys Energy Services, Naval Air Station Key West, Florida Keys Community College, City Tree Commission, Botanical Gardens Society, Garden Club, grocery stores, Hotel Motel Association, Inn Keepers Association, Monroe County, Chamber of Commerce, Key West Housing Authority, Monroe County School District, Florida Department of Transportation Technical Advisory Committee, and taxi companies.



*People watch as Matt Strahan (NOAA) makes a presentation on the effects of Climate Change on Earth Day April 22<sup>nd</sup>, 2009*

The four southeastern counties of Florida will be meeting in October, 2009 for the first Regional Climate Leadership Summit. The goal of the meeting will be to enter into a Southeast Florida Regional Climate Change Compact for the purpose of recognizing the need for immediate, collaborative and visionary action to mitigate for and adapt to the consequences of climate change. The Coordinator should meet with staff of these agencies aggregate resources, share successes, training expenses, create purchasing alliances for services and goods. Alliances with Monroe County and Keys municipalities in marketing and outreach can be built to reduce each agency's cost of many similar projects or programs. The TDC has budgeted for substantial funding for marketing the keys as a green destination to capture the socially conscious consumer. Alignment of CAP goals and tourism goals should be considered a priority.

The Green Coordinator will be required to maximize collaborative efforts to bring all initiatives to success under the umbrella program of carbon emission reduction:

- Seek alliance and partnership opportunities;
- Hire a marketing firm to work on project and develop objectives and performance measures;
- Finalize alliances and partnerships and objectives of each partner;
- Supervise marketing program and report on performance;
- Develop educational programs, objectives and performance measures;
- Supervise advertising program and measure performance;
- Recommend grant programs;
- Provide an annual report of the performance of the program and provide monthly updates to the City Commission.

The educational and outreach portion of this plan is the most important component. It includes outreach to partners, the development of alliances in the community and educational contact with all members of the community. The Coordinator will be responsible to ensure it is fully implemented. The recommended outreach program is detailed in the Education and Outreach Strategy section of the plan as well as in the Initiatives Section.

## 7.2

### *Education and Outreach Strategy*

Each program area in the Climate Action Plan (CAP) has an educational component. The most important aspect of each CAP program is the educational component. Little societal change will occur if a substantial outreach and educational program is not initiated. This plan is intended to be as comprehensive as possible, including multiple areas impacting marketing communications, for the purpose of meeting the goals set by the City Commission. The program includes marketing assessment an outreach strategy and design concept media strategy that itemizes the best combination of outreach strategies to engage the community. The plan will pull together all the elements of the Climate Action Plan to clarify and make consistent the messages being expressed by the City to staff, citizens, decision-makers, customers and other key audiences.

The City of Key West should strive to be known as a community with solutions for climate change. Our position as a major tourist destination provides the community with the opportunity to become a marketing ground for innovation. The community should therefore approach innovators and offer locations to highlight new products to the visitors from around the world.

As the community continues to make progress, tourist marketing efforts should highlight that Key West is the Community with Solutions. This concept should be promoted through such marketing efforts as those by the Tourist Development Council, the Key West Chamber of Commerce, private businesses and the Florida Keys National Marine Sanctuary.

## 7.21

### *Marketing and Advertising*

In order to be successful in reducing carbon emissions citizens have to make changes to lifestyle. It is difficult to modify ones lifestyle for ones personal benefit, none-the-less when people are asked to conserve desirable resources or spend money to make improvements. In order to educate people about climate change, and remove barriers to change a significant effort must be made in what is normally termed marketing and advertising. This plan is intended to be as comprehensive as possible, including multiple areas impacting marketing communications, for the purpose of meeting the goals set by the City Commission.

Marketing is the process of determining who the audience is, determining what the barriers to change are, and what motivates them to take action and not take action. This is not as simple as it seems since most people are not alike. Focus groups and surveys are typically used to assess the motivation in localized areas. The marketing assessment should uncover:

- Perceived barriers
- Perceived benefits
- Why is it in the best interest of the target audience to take action?
- How can the barriers be lowered and the benefits increased?
- What incentives can be offered to the target audience to take action?
- What is the target audience doing instead of the preferred action? And,
- What are the benefits they feel that they would be giving up?

An education plan, or more specifically a communications plan, must be developed that creates an outreach strategy and design concept. The plan will determine target audiences; determine which barriers need to be lowered; which target areas need incentives; and what the best way to reach each target audience. The plan will include a media strategy that itemizes the best combination of outreach strategies to engage the community. It will also recommend which other groups in the city should be involved as partners to ensure a successful plan. The plan will pull together all the elements of the Climate Action Plan to clarify and make consistent the messages being expressed by the City to staff, citizens, decision-makers, customers and other key audiences.

A Brand Promise is the guaranteed deliverable that a brand or product provides to a consumer that matters to the consumer and differentiates the brand or product from its competitors. (For example: FedEx = peace of mind; Southwest Airlines = low fares) GLEE Green Business Certification = social conscience. Generally these are the characteristics by which products are identified and differentiated. Product attributes usually comprise features, functions, benefits, and uses. Our total program, we will call “Green Program” for ease of use in this the chapter, will be analyzed to find a thread of benefits, functions, etc. that connects all aspects of the program. We will include in all communications our attributes and inspirational attributes that will deliver the green program promise.

Of critical importance in our marketing communications is the positioning of the “product”. This is the way consumers, users, buyers and others view competitive brands or types of products *relative to other brands or products*. Keeping all our citizens focused on the Key West plan as opposed to the many other green programs that are available will better performance and measurement for the CAP. The positioning of the Green Program will be determined. In order to fully live the new Green Program, it is important that we present voice and personality that is consistent with our attributes. This is how an organization expresses itself to give it character and personality, specifically, voice and personality can include:

- Words and language used
- Attitude and tone conveyed
- Ambiance and sound created

It’s an important emotional connection for both employees and “customers” to hang on to, differentiating the Green Program from other climate programs or city services, which may cause confusion and subsequent inaction. It is also important that the program’s voice and personality be repeated consistently through all communications. With repetition, it creates credibility and trust. It also sets a mood and expectation for the “Green” experience.



Bridget McDonald (GLEE) shows the recycle volunteers how to properly educate people on recycling

A value proposition is directed at customers/users/citizens and is that which sets green living apart, from the status quo. It incorporates the unique, real and credible benefits our plan provides. It should also be sharply defined. The Green Program probably has a number of value propositions, each addressed to a specific target audience. The communications plan will create our value proposition. Once a brand position is agreed upon, key marketing themes and tag lines will be created and deliverables for the program will be agreed upon.

An internal and external launch plan will be developed. It is important to have all of the City's staff on board with the green message. We will want to create passion among employees to act in a Green manner and challenge others to do so. We will ensure consistency of messages both in the media and from staff. Elements of the internal plan include:

- Communication and understanding;
- Top down support and modeling;
- Peer-to-peer support and modeling; and
- Reward system.

The external launch plan will include an awareness study to provide a baseline to measure achievement of awareness goals. Then a publicity/public relations plan will be developed, a kick-off event held to implement the new outreach strategy and then monitoring and evaluation of the strategy will occur. It is best to evaluate the process along the way to guide and shape the program. In order to be able to best evaluate the success of the program, it is important to set indicators and baselines during the planning stage so that new data can be compared to the baseline data.

The external launch plan will include the following education and outreach strategies:

- Designing websites, distributing electronic newsletters, email messages;
- Creating brochures, print ads, flyers, and postcards for direct mailings, writing newspaper articles;
- Holding/partnering/obtaining space in workshops, festivals or fairs; and
- Designing curriculum or lesson plans for grades K-12.

Components of the publicity/PR plan are divided into the following five areas:

- On-going media relations/publishing efforts;
- Presence/participation in key events;
- Charitable outreach;
- Leveraging partnerships; and
- Administration.

### 7.2.3

#### Program Costs

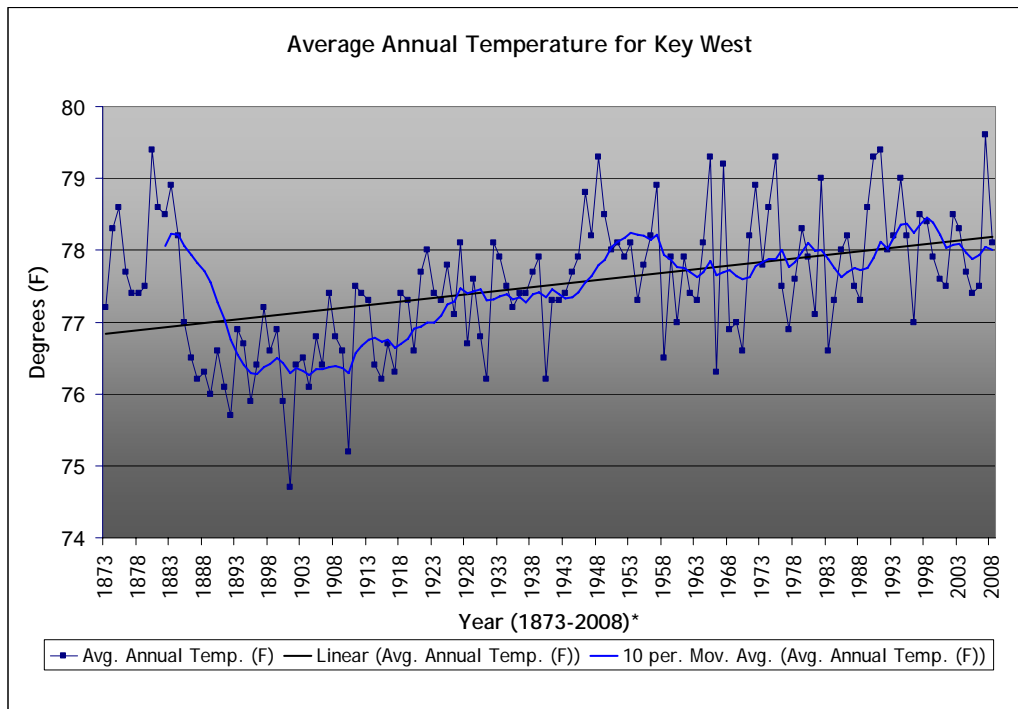
It is expected that a \$30,000-\$40,000 per year initial marketing and education budget is sufficient for the comprehensive program, which includes all aspects of the Climate Action Plan. The budget can be found from a variety of sources. The CAP includes water conservation efforts to reduce sewage plant emissions and alternative waste programs for solid waste and conservation of freshwater use overland and into storm drains to meet FDEP MS4 rules. The Solid Waste Utility fund may fund any waste related advertisements as well as a portion of the total program creation; the Sewer and Stormwater funds may do the same as well. The General Fund may be tapped and Stimulus grants sought for the program. Partnerships with Keys Energy, the FKAA, Monroe County, and other agencies may also assist in funding the program. Annual maintenance of the program will require funding for new commercials and air/media time/placements. An alliance with the TDC may help fund the program

The web based education program is expected to be in the range of \$10,000 - \$15,000 annually. This will develop an interactive one stop shop for all program elements; providing exceptionally easy instruction in greening homes, businesses, and other information required for us to meet our goals.

## 8.0 ADAPTATION

Climate Action is not just about mitigating current carbon use, but also about adapting to, or coping with, the consequences of climate change. Plans are needed for Key West to cope with the ever-rising water level and increasing temperature regardless if the rise remains at the rate it has been (8.76 inches in 100 years in Key West and 1.5 degrees Fahrenheit), or at the high end of the ICCP projection for the southeastern United States of 23 inches in water level and 4-6 degrees Fahrenheit increase in temperature. This almost 9-inch rise is the cause of frequent flooding on Front and Duval Streets which were designed 100 years ago when this rise was not anticipated. The photo to the right is the zero block of Duval Street at an extreme high tide in September, 2009. Imagine what will happen if high tide becomes another 9 inches higher; that will put high tide over the sidewalks and into the stores and restaurants. We must adapt now to be ready for this inevitable event.





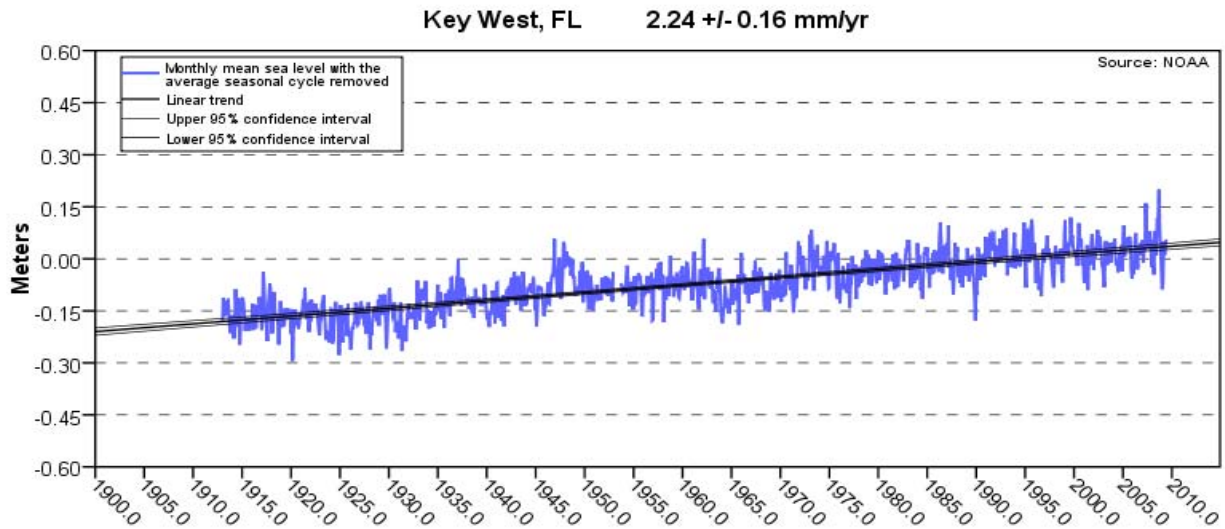
Courtesy of NOAA National Weather Service, Key West

**Figure 4 – Average Annual Temperature for Key West 1873-2008**

Humans have in the past had global emergencies that were successfully mitigated through infrastructure investments, technological advancements, and behavior change. For example, in the case of Ozone layer depletion; not only did behavior change (reduction in the use of aerosol spray), but the implementation of new refrigeration chemicals reduced the scope of the problem from imminent danger to a manageable life style change (i.e. the use of more sunscreen and spending less time in the sun.) Likewise, greenhouse gasses are causing changes that create a significantly warmer climate increasing risk of drought, flooding, fires, disease and sea level rise, so we must react through behavior change and new technologies.

Policy makers and emergency management staff have an opportunity to prepare today for the impacts of climate change. The topic has been discussed for over 30-years, the science of projecting impacts has been determined to be sound. Impacts are being observed and it is time to act on an adaptation strategy. We now know that some impacts are inevitable, probably at a minimum, a 9-inch rise in tide by 2100. We must help prepare the City of Key West and the citizens to adapt to climate change so we can manage the economic and ecological consequences. The actions we take will have significant impact for generations to come.

## Mean Sea Level Trend 8724580 Key West, Florida



**The mean sea level trend is 2.24 millimeters/year with a 95% confidence interval of +/- 0.16 mm/yr based on monthly mean sea level data from 1913 to 2006 which is equivalent to a change of 0.73 feet (8.76 inches) in 100years.**

NOAA, National Weather Service Forecast Office Key West, FL September, 2009

**Figure 5 – Mean Sea level Trend Key West Florida 1913-2006**

### 8.1 Resiliency

Many of the essential services our government provides needs to be responsive to climate changes today. We must excel at adaptation and mitigation because Key West and our water supply is “ground zero” for sea level rise, ocean warming and ocean acidification with all their consequences. This provides Key West an opportunity to transform the island’s buildings into more sustainable structures and grow its economy through sustainable economic development. Even if greenhouse gasses are reduced significantly, climate change is going to continue long after; it takes tens of thousands of years for some greenhouse gas molecules to be broken down. It is inevitable that climate change will bring about negative economic consequences. With planning we may be able to create alternative economic opportunities that may benefit our city today and in the future.

Preparing for climate change should be recognized as is a key element of the City’s mission and strategic plan priorities which specify protecting the city, its quality of life and environment. We will need to anticipate the coming

Making America the greenest country is not a selfless act of charity...it is now a core national security and economic interest.  
-Thomas L. Freidman

changes and become climate resilient. We will do so by gathering and analyzing information to inform policy and projects through creation of a resiliency plan. Collective planning in all areas will be less costly as we may be able to anticipate impacts and seek funding years in advance of climate impact. No one knows more about Key West than the people who live here, and their ability to lead state, federal and county governments in the right direction early enough will ensure less desirable changes are not imposed upon us.

## 8.2

### *Getting Ahead of the Curve*

Some programs in Key West are already in advance planning for adaptation: Florida Keys Aqueduct Authority is preparing for salt water intrusion in its mainland water supply wells; the City has plans to elevate roads (i.e. Northside Drive); and building new storm water systems that will help to meet the new demands (i.e. pump stations). Together the FCAA and City are seeking ways to reduce the need for fresh water from the mainland through reclaimed water use. Most of these programs have been significantly funded or completely funded by outside agencies because of the forethought put into planning efforts. Appropriate planning and construction can strategically reduce future risks, increase future benefits and add value to investments all providing a higher quality of life today, before climate change makes the need critical.

The adaptation section of this climate action plan outlines the planning process that is recommended. Similar to the process of the Climate Action Team the adaptation plan needs the support of the community and other governmental organizations and non-governmental organizations (NGO's). All areas of planning need to be reexamined through the lens of climate change. The plan needs to address ecologically sensitive land planning, flood plain planning, utility planning, zoning and build-back planning and shoreline hardening. The planning process will include vulnerability assessments and risk assessments, so that a climate resilient community with preparedness goals and preparedness action can be established.

The United States Army Corps of Engineers, the United States government's main engineering design department, has upgraded its 1975 policy on incorporating sea level rise in construction design and planning to a July 1, 2009 policy Circular No. 1165-2-211 which requires "incorporating the direct and indirect physical effects of projected future sea-level change in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects. Recent climate research by the Intergovernmental Panel on Climate Change (IPCC) predicts continued or accelerated global warming for the 21st Century and possibly beyond, which will cause a continued or accelerated rise in global mean sea-level. Impacts to coastal and estuarine zones caused by sea-level change must be considered in all phases of Civil Works programs." The new policy requires consideration of three possible scenarios; for projects with a 50 year life being built in 2010 the scenarios are 1.2 feet, 1.5 feet, and 4.9 feet. Prior to this policy the USACE worked with a projected rise of 0.8-foot (9.6 inches)\* for 2050. \*Adaptive response Planning to Sea Level Rise in Florida and Implications for Comprehensive and Public Facilities Planning; Deyle, Bailey and Matheny, Dept of Urban and Regional Planning, FSU, Sept, 2007.

It is recommended that the City use ICLEI's guide "Preparing for Climate Change" or a similar model as a tool to move forward. The creation of a climate change preparedness team is recommended. The consequences of climate change are broad and encompass inter-

departmental activity and extend to other local, state and federal agencies. The preparedness team will need to include City departments and local, state and federal agencies. For instance, the South Florida Water Management District must seriously consider allowing stormwater pump stations to outfall into near-shore waters so our streets and homes may be protected. We



need to influence decisions of the FDOT where they are lowering rather than raising North Roosevelt Blvd. The local and state departments of emergency management and FEMA will need to re-address evacuations and increases in storm surge. The FDEP will have to re-address “wetlands” evaluations; the County will have to consider the elevation of the airport runways; the US Fish and Wildlife Service will have to consider habitat changes; and the state Historic Preservation Board will want to consider how to maintain historic

structures that may be negatively impacted. The photo above is high tide on Green Street where salt water sometimes enters the historic buildings on the block.

The photos inserted in this section are photographs of the September 24, 2009 Perigean Spring Tides. Although these are extreme tides, they occur many days of the year. According to the National Weather Service Meteorologist Jon Rizzo, the tides were 3.2 feet above MLLW in Key West, which is approximately 2.3 feet above mean sea level. This is a serious threat to traffic, walking, and biking since more accidents can happen under such conditions. Asphalt is damaged at greater rates as is underground utilities.

Figure 6, the map on the next page, assists the reader to comprehend and appreciate the depth of impacts in the city, even for the small sea level rise scenario of 9 inches by 2100. A nine-inch rise brings the daily mean high tide to 3.24 feet NGVD (areas unmarked in white) and extreme high tides, which happen almost monthly to 3.94 feet NGVD (marked in Orange). Note the number of streets and recreational facilities impacted. The photo to the right depicts what will become an every day event under the IPCC best case scenario.



In addition to sea level rise an increase in temperature will increase the need for air conditioning and energy use, affect seniors and those with lung disease and even sports practices for school children.



ESTIMATE OF 9" SEA LEVEL RISE CITY OF KEY WEST

**Figure 6**

Note 1: See larger map in the Appendix 6

Note 2: Areas on the US Navy base, although white, were not surveyed and are not included in the rise estimate.

### 8.3

#### *The Planning Process*

Potential members of the climate change preparedness team will be talented and motivated people from Emergency Management, Community Services, Monroe County Health Department, Police Department, Port Department, Planning and Building Departments, General Services Department and some business/community leaders, non-profit organizations and federal agencies like NOAA's National Marine Sanctuary and the National Weather Service, and US Fish and Wildlife. NGO's like The Nature Conservancy and Botanical Gardens Society will also be required to create a well rounded plan. The members should be given substantial time to work on the program and be able to guide others across agency lines to ensure the plan is a success.

It is proposed that the team will initiate five major process steps:

1. Conduct a resiliency study;
2. Identify priority planning areas for action based on assessments of vulnerability and risk planning areas;
3. Set goals and develop a plan;
4. Implement the plan; and
5. Measure progress and update the plan.

The planning document will have to be updated from year to year depending on local and grant funding. A strong system will need to be in place to ensure that the program continues to meet goals, has robust community support, and can change as technology and conditions change.

Initially the group would identify major planning areas relevant to climate change and then complete a vulnerability assessment that will include a sensitivity analysis of the systems associated with the planning area identified. It will evaluate the adaptive capacity of the systems associated with the planning areas. A risk assessment of how vulnerable the systems in those planning areas are to the affects of climate change and a determination of our City's tolerance to the risk will be made.

Then the group would develop a vision and guiding principals for a climate resilient community. Goals would be set and prioritized action items developed including a cost to benefit analysis and recommended timeframe. The plan will list desired accomplishments, as well as which activities our government and every agency will undertake.

The implementation plan will need to provide authority and direction to city staff so that policy, planning and infrastructure changes can be implemented. The plan should be updated annually based on evaluation of goals and performance measures which will be qualitative and quantitative measures of resiliency.

#### **8.4**

##### **Potential Areas of Concern**

Virtually every aspect of government operations will be affected by adaptation requirements, from civil engineering road work, to citing of new facilities. Decisions to repair or reconstruct existing facilities, or improve stormwater, or sewer systems, or selection of planting materials will all have adaptation in the decision matrix.

Table 2 lists locations and infrastructure areas of concern to be addressed in sea level rise planning:

<b>Location</b>	<b>Damage as result of Climate Change</b>
McCoy Indigenous Park	inundation and tree deaths
Landfill	as sea levels rise more waste may become soluble in near-shore water
Seawalls	walls will need reconstruction
Beaches	will be reduced in size
Salt Ponds Habitat	will enlarge, salt water will cause destruction of less saltwater tolerant plants
Berg Park	Greater erosion of the beach and damage to the decking, continued loss of less salt tolerant trees
Kitsos Park	Greater erosion of the beach and damage to the decking, continued loss of less salt tolerant trees
Gravity sewer system	Increased salt water infiltration
Sewer Pump Stations	Inundation of some wet wells
Stormwater system	Reduced functioning of systems
Botanical Gardens	Destruction of less salt water/heat tolerant trees
Little Hamaca Park	Destruction of less salt water tolerant trees reduced park land mass
Hawk Missile Site	Reduced park land mass
Garrison Bight	Dock modifications
Key West Bight	Dock modifications
Staple Ave Bridge	Accelerated deterioration
M.C. Airport	More frequently flooded tarmac
City Pool	Additional flooding of building
Cemetery	Collapse of grave sites
Aquarium	Additional flooding of building
Clinton Square	Street inundation traffic
Access to College Road	Roadway inundation

**Table 2 – Location and Possible Affects of Climate Change**

Although mitigation projects worldwide may offset sea level rise at the high end of the IPCC modeling spectrum (23-35 inches in the Keys), planning efforts must consider the entire spectrum. The Table 3 below lists streets portions of which will be inundated at high tide if a 9-inch sea level rise is realized. This information, as well as the map in Figure 6 is useful to generally determine if additional consideration is required for upcoming infrastructure projects. For instance, installation of wells on streets below 3.94 feet may become conduits for salt water intrusion.

**Roadways in Key West expected to have tidal water with a 9-inch tide rise**

Donald Avenue	Dennis	Leon Street
Front Street	Venitia	Ashby Street
Duval Street	Blanch	George Street
Elizabeth Street	Patterson	Washington Street
Green Street	Fogarty	Eaton Street
James Street	Harris	Catherine Street
Front Street	Seidenburg	Amelia Street
Wall Street	Staples	Eisenhower Drive
Ann Street	Linda	Petronia Street
Simonton Street	Juanita	Jose Marti Dr.
Thompson Street	Flagler	Duncan Street
Telegraph Lane	Laird	United Street
Wolkowski Lane	Rose Patricia	1 <sup>st</sup>
Fitzpatrick Street	Atlantic	2 <sup>nd</sup>
Tifts Alley	Stephens	3 <sup>rd</sup>
Atlantic Boulevard	Sirugo	4 <sup>th</sup>
Exchange Street	White	5 <sup>th</sup>
Caroline Street	Josephine	6 <sup>th</sup>
Seminary Street	Bertha	7 <sup>th</sup>
South Street	10th	8 <sup>th</sup>
Riviera Drive	11 <sup>th</sup>	20 <sup>th</sup>

**Table 3 – List of Streets Which will have Portions of Roadways Inundated by Salt Water**

Clearly, any capital projects to be considered in the city must reflect consideration of temperature and sea level rise.

**8.5**

***Adaption Success Planning***

In Summary, over the years there have been dramatic changes on the island in the delivery of water, the delivery of sewer services, in our industry, and caused by hurricanes, fires, etc. All previous generation’s ability to adapt to change made Key West successful. This generation now has the opportunity to step forward and plan to provide an acceptable home to those in the future. Climate Change in Key West is an opportunity to transform the island to a more sustainable community. Planning to adapt to that future now will help us realize a vibrant Key West in the future.

## 9.0 CAT Implementation Plan

The below proposed initiatives will assist in the completion of an implementation plan recommended to be complete by May, 2010. There are five program initiatives to be marketed, each with a number of goals. They include the Commercial Climate Challenge, Residential Climate Challenge, Incentivize Energy Conservation, Key West Transit Challenge, and Bicycle/Pedestrian Challenge. Each have recommended progress indicators.

### 9.1

#### Commercial Climate Challenge

**This program will engage Key West’s business community to reduce their greenhouse gas emissions. The City will act as a catalyst developing alliances and partnerships throughout the community, funding organizations, non-profit and other governmental agencies to assist local businesses in meeting their goals. Appendix 7 exhibits two showcase examples of local businesses engaging in high quality reduction measures. It is expected a variety of organization will provide education and materials and the City will provide an interactive web site collating all required information needed to easily select emissions reduction measures and report results. Some measures require city policy changes, action and purchases or infrastructure modifications. Initiative includes:**

9.1.1: Expand employee commuter benefits. Commuter benefits with the largest potential impact on greenhouse gas emissions are transit subsidies, vanpools, and cash in lieu of parking. Other commuter benefits include tele-working, virtual working, bike lockers and showers, preferred car pool parking, compressed work schedules, shuttles, and rideshare matching. National studies show 0.5 mtCO<sub>2</sub>e saved for every employee covered by the EPA’s “Best Workplace for Commuters” program;

9.1.2: Increase green fleets Expected Outcome: 200 Hybrid vehicles; 200 EV;

9.1.3: Implement green building improvements such as green roofs, landscaping, etc  
Expected Outcome: 100 White roofs, 200 trees for shade, 200 weatherization 5% reduction CO<sub>2</sub>e x 200;

9.1.4: Tie the agencies CEO salary to the energy savings;

9.1.5: Encourage large user agencies to use shared savings/performance contracting;

9.1.6: Every commercial building to perform self energy audit building commission audit;

9.1.7: Reduce paper consumption (less haul down, create, haul out less purchasing costs);

9.1.8: Work with all government agencies to implement green office audit for all public offices with milestones, goals, timelines, produce recognition system to staff (2% red x 600);

9.1.9: Partner for use of GLEE’s Green Business Certification as part of challenge for continued annual improvement;

9.1.10: Require all Businesses that are leased to be energy star profile rated to encourage owners to improve leased buildings;

9.1.11: Offer workplace recycling, 4 mtCO<sub>2</sub>e saved per ton of waste recycled. Expected outcome: recycle 4,000 tons ( -16 mtCO<sub>2</sub>e);

9.1.12: Pay as you throw trash (incentivize composting, recycle, reduce) offer electronic waste, lamp waste, battery waste;

- 9.1.13: Plastic beer mugs;
- 9.1.14: Provide a commercial revolving loan fund for weatherization;
- 9.1.15: Establish an energy museum to provide viewing of green businesses and building initiatives;
- 9.1.16: Provide green purchasing guide lines to businesses including energy star equipment;
- 9.1.17: Partner with USN to reduce electric use by 10%;
- 9.1.18: Encourage use of LED Christmas lights; and
- 9.1.19: Awards will be given to businesses that take the challenge and report energy savings.

Progress indicators: reduction in commercial energy use

- Number of bus passes
- Number of bike tax credits reported
- Increase in commercial recycling accounts
- Number of commercial alternative energy permits issues
- Number of white roofs reported

**Expected Outcome:** Reduce energy use by 15% in 600 businesses

## 9.2

### **Residential Climate Challenge**

**This program will engage Key West residents to reduce carbon emissions through a program of education in the areas of home energy use and transportation. Homeowners will be encouraged to use clean energy through installation of residential alternative energy systems or purchase of clean power from Keys Energy Services.**

- 9.2.1: Create a model in home energy display system which will enable families to see home energy use and cost in real time on electric displays. Expected outcome: 7,000 residents will reduce home energy use by 10%;
- 9.2.2: Residents will be challenged to “turn it up a notch”. Each degree one raises on A/C thermostat there A/C energy use goes down 3%;
- 9.2.3: Create a marketing program to reach every resident to promote green issues;
- 9.2.4: Create partnerships with Keys Energy Services to provide enhanced home energy audits and installation of limited weatherization items;
- 9.2.5: Partner with the Florida Keys Aqueduct Authority and South Florida Water Management District to reduce water use by 10% through education, grants, rain barrels and other measures;
- 9.2.6: Promote walking and bike riding to work and school;
- 9.2.7: Initiate a revolving loan fund weatherization projects;
- 9.2.8: Promote use of Key West Transit;
- 9.2.9: Promote white roof program;
- 9.2.10: Promote “ClimateCulture.com” to K-12 children;
- 9.2.11: Promote use of LED holiday lights;
- 9.2.12: Promote recycling and enforce the code; and
- 9.2.13: Awards will be given to residents who enter the challenge and show excellent progress.
- 9.2.14: Consider Ordinance requiring rental unit owners transfer leases with clean a/c filter and no leaking faucets and toilets

Progress Indicators:

- Increase in recycling rate
- Reduction in residential energy use
- Increase in bus ridership
- Increase in bike use
- Number of permitted solar and wind energy installations

**Expected Outcome:** 15% reduction in residential energy use in 7,000 homes; 5% reduction in 2000 homes.

### **9.3**

#### **Incentivize Energy Conservation**

**This program aims to create the conditions under which energy users will be able to use and purchase energy with greater choice and efficiency. It is proposed energy conservation measures will be sought out by energy users since it is cost effective or socially inviting. This will be accomplished through showcasing alternative energy systems and providing incentives to reduce energy use.**

9.3.1 Monroe County School District will install 25KW wind power generator;

9.3.2 Keys Energy Services will partner with NOAA to install wind generators;

9.3.3 Install two 250kw wind energy generators;

9.3.4 Keys Energy Services will partner with NOAA to install solar project;

9.3.5 Implement a tiered rate for electricity consumption for homes and businesses that consume above average amounts of electricity. Develop means to avoid the inequitable impacts on low-income residents. Use additional fund balance to fund alternative energy projects;

Create a peak time energy system that reduces construction of new power plants and encourage energy savings;

City to create incentives if a developer uses solar, or wind energy;

Consider a utility tax for electric and propane which will provide a revolving loan fund and incentivize conservation;

Encourage the FKAA to enhance its rate structure to disincentivize water use,

Develop an alliance of building and education professionals to promote green building technologies and needed education; and

Create an energy museum to show visitors energy savings initiatives.

Progress Indicators:

- Decrease in energy consumption rate
- Number of wind turbine systems installed
- Number of alliances actively working
- Number of energy audits requested
- Additional funding realized and invested in alternative energy and conservation

**Expected Outcome:** 4,000 residents will seek energy audits, 400 permits for solar or wind installations will be issued.

## 9.4

### **Key West Transit Challenge**

**This project will enhance the usability of the City bus system and encourage the use of it over personal motor vehicles.**

- 9.4.1 Establish a sub committee as an authority to oversee private sector and public sector help in promoting and enabling people to use an alternatives to the car;
- 9.4.2 Create a spectacular marketing program;
- 9.4.3 Provide sufficient bike rack at bus;
- 9.4.4 Bike storage/ service centers (sears town and old town garage);
- 9.4.5 Bike racks at all Keys Shuttle stops;
- 9.4.6 Install bike enclosure at KEYS shuttle stops as requested (install 4 as trial units);
- 9.4.7 Upgrade all bus stops;
- 9.4.8 Install schedules and maps at each bus stop;
- 9.4.9 Install rain/shade covers at each stop;
- 9.4.10 Ensure all stops are ADA accessible;
- 9.4.11 Bike storage/ service centers (sears town and old town garage);
- 9.4.12 Initiate free bus weeks in coordinated with reduced parking weeks or days in old-town;
- 9.4.13 Consider outsourcing a fixed down town route to a franchise train/trolley type vendor;  
and
- 9.4.14 Create bus training school field trips.

#### **Progress Indicators:**

- Number of bus riders

**Expected Outcome:** Increase ridership by an average of 100 commuters daily

## 9.5

### **Bicycle Pedestrian Challenge:**

**This project will promote walking and biking to reduce vehicle miles traveled by enhancing the walk-ability of the island, through programs and improved bike trails, routes and sidewalk infrastructure.**

- 9.5.1 Provide sufficient bike racks at bus stop;
- 9.5.2 Increase bicycle parking around city;
- 9.5.3 Establish a sub committee as an authority to oversee private sector and public sector help in promoting and enabling people to use an alternatives to the car;
- 9.5.4 Install bike enclosure at KEYS shuttle stops;
- 9.5.5 Complete the bicycle pedestrian plan(authorized by Commission resolution);
- 9.5.6 By 2011, install handicap ramps at all existing sidewalks on the bicycle pedestrian plan, trim trees and bushes away from sidewalk so that pedestrians and young cyclers can use sidewalk;

- 9.5.7 Re-write the city ordinance to make it clear that the homeowner is responsible to maintain the trees in front of the property and to ensure that the trees do not protrude into the sidewalk;
- 9.5.8 Maintain all marking on path and bicycle lanes; improve as needed;
- 9.5.9 Provide a repair inventory for all sidewalks with cracks greater than 1/25 of an inch and maintain on annual basis;
- 9.5.10 TV shows and commercials encouraging people to ride bikes throughout town;
- 9.5.11 Bicycle link on website to show all the bicycle and pedestrian routes in town;
- 9.5.12 Quarterly walk/ bike to work day;
- 9.5.13 Have continuous safe routes to schools programs for all grade school children encouraging children to ride their bikes and walk to school;
- 9.5.14 Have schools provide extra credit or gifts to children who get their parents to walk/bike with them to school;
- 9.5.15 Ensure all bicycle racks are installed to meet the City Code and development requirements for bicycle parking;
- 9.5.16 Remove stop signs where unwarranted, limit new stop sign placement to those that comply with the state warrant for traffic control, have licensed professionals determine the need for stop signs;
- 9.5.17 Driver education program wrt bicycling on the city television station and PSA,s;
- 9.5.18 Maintain all intersections with trees and objects clear between 30 inches and 10 feet in height;
- 9.5.19 Provide an annual update of sidewalk repair program;
- 9.5.20 In the LDR requirements for automobiles with the corresponding increase in bike/ moped requirements;
- 9.5.21 Creation of a new bike path/routes filling of gaps in the existing bike path/routes;
- 9.5.22 Improvements in current bike path/ routes. Curb cuts, directional signage, street marking, signals – the list is not all-inclusive;
- 9.5.23 Portable trailer for large bike racks for festivals and TDC to promote Key West as a bike friendly town;
- 9.5.24 Bike storage/ service centers (sears town and old town garage);
- 9.5.25 More or better ways to rack bikes;
- 9.5.26 Comprehensive traffic planning to improve bike traffic flow(connecting routes to popular destinations ensuring the shortest bike route possible); and
- 9.5.27 Removal of excess stop signs or marked crossing and replacing them with traffic calming devices.

**Progress Indicators:**

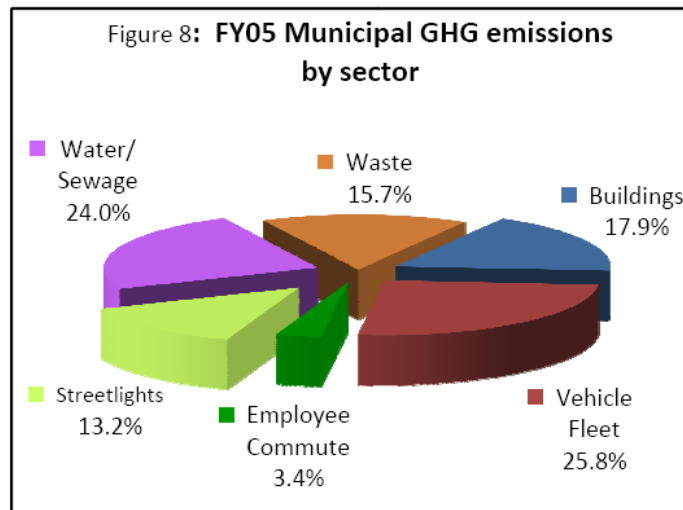
- Number of bikes on trails/routes
- Number of bikes in racks
- Value of savings on pay not to park programs

**Expected Outcome:** Increase the number of bikes commuting to work and school by 200

## 10.0 City Government Operations

City government operations are 4.4% of the community GHG emissions totaling 17,596 tons, and the City is the third largest user of commercial energy. The cost of energy (fuel and electric) for the city operations in 2005 was \$3.1 million (not including Waste Management waste hauling and most staff commuting). Meeting the goal of reducing emissions by 15% will have a significant affect on the operation costs for the general fund, utilities and other funds since conservation and investment in zero fuel renewable energy are the key objectives of this action plan. A 15% reduction in energy expenses would save the city \$473,648. It is well documented that simple energy conservation programs can easily save 10% of older facilities' energy costs. The investment in a strict energy management program with direct reporting to the City Manager is the key element to achieving the City Commission's goal. The program is expected pay for itself in one year.

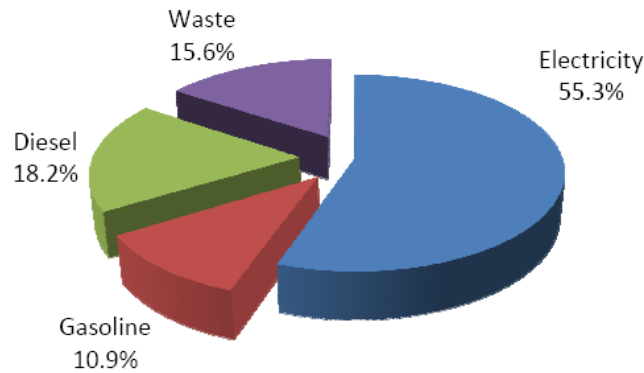
The Greenhouse Gas Emission Inventory charts below indicate the municipal GHG emission by sector and energy source. Figure 7 indicate that fleet operation is the City's primary GHG emitter by sector, however when looked at from the perspective of energy source electricity is largest sink.



Excerpted from City of Key West Green House Gas Emissions Inventory January, 2008

**Figure 7 - FY05 Municipal GHG Emissions by Sector**

**FY05 Municipal Emissions by Energy Source**



Excerpted from City of Key West Green House Gas Emissions Inventory January, 2008

**Figure 8 – FY05 Municipal Emissions by Energy Source**

Table 4, below, lists the tons of energy of operation by use by sector, indicating the tons emitted and fund spent. The 15% goal that the City Commission mandated will enable a reduction of GHG emissions by 2,639 tons.

<i>FY05 Government Emissions by Sector</i>	<i>Equiv CO2 (tons)</i>	<i>Equiv CO2 (%)</i>	<i>Energy (MMBtu)</i>	<i>Cost (\$)</i>
<b>Buildings</b>	3,158	17.9	17,493	591,076
<b>Vehicle Fleet Total</b>	4,532	25.8	58,732	605,387
<i>City vehicles</i>	2,482	14.1	28,864	605,387
<i>Waste hauling</i>	2,050	11.7	29,868	-
<i>Employee Commute</i>	602	3.4	7,070	-
<b>Streetlights</b>	2,331	13.2	12,914	461,925
<b>Water/Sewage</b>	4,217	24.4	23,363	752,219
<b>Waste</b>	2,756	15.7		717,062
<b>Total</b>	17,596	100	119,572	3,157,659

Excerpted from City of Key West Green House Gas Emissions Inventory January, 2008

**Table 4 - FY05 Municipal Government Emissions, Energy use and Cost**

**Reduction Initiatives**

**Reduce municipal operation emissions by 15% by 2015 through energy conservation and increased non fossil fuel energy use. Following are the specific recommendations:**

**10.1. Transportation**

10.1.1. Increase Ridership on Existing Routes through:

- 10.1.1.1. 76 degree busses
- 10.1.1.2. Clean bus stops (trash containers, cigarette butt dispenser, weekly clean by street sweeper with vacuum)
- 10.1.1.3. Shaded stops
- 10.1.1.4. Weather protection
- 10.1.1.5. Clear bus route map posted
- 10.1.1.6. Schedule posted
- 10.1.1.7. Clear notice on days bus does not run
- 10.1.1.8. Spanish schedules and maps
- 10.1.1.9. Creole schedules and maps
- 10.1.1.10. Bike racks at bus stops (especially at all keys shuttle routes);
- 10.1.1.11. Bike closets (lower keys shuttle routes);
- 10.1.1.12. All stops to be ADA accessible;
- 10.1.2 Advertising and Promotion:
  - 10.1.2.1 Alliances with business to provide reduced fares (bulk discount) and pay not to park program;
  - 10.1.2.2 Install a pay station for bus ticket purchases at the airport and ferry terminal;
  - 10.1.2.3 Promote the US Navy bus fare rebate;
  - 10.1.2.4 Have a free, well promoted bus week;
  - 10.1.2.5 Have bus field trips with elementary schools;
  - 10.1.2.6 Bike storage/facilities at lower keys departure points in Key West;
- 10.1.3 Employee Service Center - promote incentives city and businesses- pay not to park;
- 10.1.4 Partner with businesses to provide bike rentals @ lower keys shuttle stops;
- 10.1.5 Create alliance with businesses to give out discounted or free bus tickets to people;
- 10.1.6 Maintain a commuter route that stops downtown;
- 10.1.7 Create shuttle bus from Front Street to Truman Waterfront, Southernmost Point to Reynolds Street down United to Simonton and back to Front LPG on hybrid;
- 10.1.8 Establish a subcommittee as an authority to oversee private sector and public sector help in promoting and enabling people to use mass transit; and
- 10.1.9 Install a solar panel farm above the proposed tour bus parking facilities which will power electric plug in so busses will not idle.

## **10.2 Bicycle/ Pedestrian Transportation**

- 10.2.1 Install showers at City Facilities to promote biking to work;
- 10.2.2 Pay not to park program;
- 10.2.3 Partner with bike shops to teach people how to fix bikes and rider safety;
- 10.2.4 Enhance grade school bike education;
- 10.2.5 Offer adult bike riding lessons;
- 10.2.6 Create more and interesting bike racks;
- 10.2.7 Use pay not to park profit for bike education program; and
- 10.2.8 Consider seriously promoting bike licensing through licensing department.

## **10.3 Other Transportation**

- 10.3.1 Promote car pooling on carpooling website;
- 10.3.2 Partner with FDOT for van rideshare program;

- 10.3.3 Promote alternative vehicle fleets (hybrids & electric cars);
- 10.3.4 Phase out city fleet and phase in hybrid and electrical vehicles and bicycles;
- 10.3.5 Seek zip car firm to move into City of Key West;
- 10.3.6 Incentivize electric residential vehicles by free parking spots for electric cars on some spots around Duval Street;
- 10.3.7 Promote 1 car families;
- 10.3.8 Provide incentives for hybrid/ electric taxi's;
- 10.3.9 Install electric car charging stations @ all city garages and in streets with limited driveways;
- 10.3.10 Create and anti-idling program;
- 10.3.11 Track City fleet vehicle idling;
- 10.3.12 Consider Fire Department food shopping by use of watch Commander Vehicle; and
- 10.3.13 Provide pressure indicator caps for tires.

#### **10.4. Waste Systems**

##### **10.4.1** Decrease waste hauled from the city through:

- 10.4.1.1 Increased home composting;
- 10.4.1.2 Create a community compost center;
- 10.4.1.3 Community recycling in the city limits;
- 10.4.1.4 Increase R4 education;
- 10.4.1.5 Improve waste management customer satisfaction by becoming more customer orientated;
- 10.4.1.6 Have a performance based waste management contract;
- 10.4.1.7 Increase number of commercial recycling contracts;
- 10.4.1.8 Decrease in number of recycling complaints;
- 10.4.1.9 Promote commercial recycling and group recycling on streets;
- 10.4.1.10 Create mandatory commercial recycling (currently as low as for \$2.50/ month);
- 10.4.1.11 Provide for adequate recycling @ all city facilities;
- 10.4.1.12 Require recycling in all city leagues and sports agreements;
- 10.4.1.13 Commercial recycling rates lower than trash rates;
- 10.4.1.14 Provide E-Waste drop off in the city limits and promote it;

##### **10.4.2** Reduce greenhouse gas emissions through:

- 10.4.2.1 Provide hazardous waste drop off 12 times per year;
- 10.4.2.2 New waste contract cannot stipulate minimum volume of waste or all waste available to vendor;
- 10.4.2.3 New waste contract should require use of a waste to energy facility;
- 10.4.2.4 New waste contract to accept CFC's and fluorescent bulbs curbside;
- 10.4.2.5 Promote waste reduction strategies; green business certifications, recycling, hazardous and E-Waste drop off, light bulb drop off;
- 10.4.2.5 Promote product stewardship though mandatory commercial take-back programs;
- 10.4.2.6. Require staff to consider packaging waste in purchases (forcing the supplier to use less packaging, purchase in bulk);
- 10.4.2.7 Purchase only Energy Star electric products and Epeat ([www.epeat.net](http://www.epeat.net)) electronics;
- 10.4.2.8 Analyze the flaming of methane gas from the landfill, if it reduces significant emissions install it; and

**10.4.3** Add greenhouse gas emissions as waste product that falls under the Solid Waste Utility to fund emission reduction and sequestration.

#### **10.4 Sustainability**

10.4.1 Become Green City Certified;

10.4.2 Enhance bike theft prevention through licensing, searching for stolen bikes and prosecution;

10.4.3 Create solar protection ordinance so new larger buildings do not shade solar systems;

10.4.4 Require all city leases to have requirements that lessees are to be green business certified and portfolio manager certified and have recycling;

10.4.5 Consider an ordinance to require new construction have solar pool and water heaters;

10.4.6 Consider reducing the required number of parking spaces and increasing the number of bicycle spaces or employee showers as incentive for wind and solar energy use;

#### **10.5 Waste Water Treatment**

10.6.1 Install diffused air system at plant;

10.6.2 Have full A/C system designed for current high efficiency standards by HVAC engineer;

10.6.3 Have an ESCO for the full waste water system;

10.6.4 Change facility lights to exterior lights to LED's;

10.6.5 Add wind powered 250 kw energy to generator unit;

10.6.6 Change fleet to alternative energy vehicles;

10.6.7 Install cistern water systems for vacuum truck;

10.6.8 Installation of compost system for solids;

10.6.9 Install chlorine system and provide FKAA water for reclaimed H2O Systems.

10.6.10 Look into digester gas recovery; and

10.6.11 Develop partnership with FKAA and SFWMD to reduce water use by 10% .

#### **10.7 Planning and Building**

10.7.1 Do not approve a variances for reduced open spaces and reduced pervious surface;

10.7.2 Modify code to disallow pervious pavement and "pervious bricks" without a healthy grass volume;

10.7.2 Modify the comprehensive plan to include the wide array of green incentives into the City of Key West;

10.7.3 Identify all capital projects and have them reviewed for green building construction elements;

10.7.4 Incentivize alternative transportation for all City facilities and planning department approvals;

10.7.5 Incentivize green building components (reduced building fees, faster inspection...);

10.7.6 Encourage LED exterior lighting;

- 10.7.7 Enforce bike rack installation at city property and private property;
- 10.7.8 Consider changing parking ratio for less car parking and more bike parking;
- 10.7.9 Require waste contractor to approve waste recycle area for all DRC approvals;

### **10.8 City Commission**

- 10.8.1 Direct City Manager to allocate 25% of energy savings (fuel and electric) to staff bonus;
- 10.8.2 Create mandatory reduction, reuse and recycling programs for all city facilities;
- 10.8.3 Enforce existing and improve codes that require building owner to maintain the sidewalks and right of way in front of their building. This will reduce city maintenance and landscape as well as contractor vehicle emissions (and contractor costs);
- 10.8.4 Add greenhouse gas emissions a waste product that falls under the Solid Waste Utility to fund emission reduction and sequestration;
- 10.8.5 Promote product stewardship through mandatory commercial take-back programs;
- 10.8.6 Only give grants to organization which are green certified and for construction projects, that have green components projects;
- 10.8.7 Create an education and outreach program with the assistance of a marketing and advertising firms that meets the goals of the Climate Action Plan;
- 10.8.8 Create an ordinance that all flat roofs must be highly reflective, and
- 10.8.9 Have the City Manager report on City government goal progress.

### **10.9 Facilities**

- 10.9.1 Perform commercial grade energy audits of all City owned buildings;
- 10.9.2 Implement the cost effective audit recommendations initially;
- 10.9.3 Hire an energy manager to perform energy audits;
- 10.9.4 Have written Standard Operating Procedures for the management of every building owned by the city;
- 10.9.5 Phase out the use of desk top PC's and use thin clients by 2015;
- 10.9.6 Install central surge protectors to eliminate the need for at desk systems;
- 10.9.7 Hire an ESCO make recommendation for the waste water treatment system;
- 10.9.8 Install electric charging stations at all utility parking city with electric metering;
- 10.9.9 Create and train associates on paper reduction program;
- 10.9.10 Enforce existing "Green Policies" in all facilities;
- 10.9.11 Obtain GLEE Green Business certification for all buildings;
- 10.9.12 Have all city buildings EPA energy portfolio certified;
- 10.9.13 Require all electronics and electronic equipment in city buildings to be energy star rated;
- 10.9.14 Create a building and departmental tracking system to track energy, money and carbon saved by departments and develop a recognition system;
- 10.9.15 Install more and accessible bike racks at all city facilities;
- 10.9.16 Trim all plants to make a walkway and bikeways accessible at all city buildings;
- 10.9.17 Apply for water and energy conservation grants;
- 10.9.18 Change park and ride to LED & solar power;
- 10.9.19 Replace street and parking lot lights with LED's;
- 10.9.20 Create cisterns at all large city facilities to supply street sweepers and water buffalos;

- 10.9.21 Install occupancy sensors in selected offices bath and conference rooms;
- 10.9.22 Install insulation in un-insulated conditioned spaces;
- 10.9.23 Paint all roofs that are dark, white (ROI 1.5 yrs);
- 10.9.24 The City shall publish monthly the energy use for the last 24 months in a local publication;
- 10.9.25 Install window film or shade covers on select city windows on west face; and
- 10.9.26 Install shade trees on west side of buildings; and
- 10.9.27 Ensure all exit signs are lighted by LED's.

11.1

## APPENDIX 1

Resolution 07-160- Kyoto Protocol; Directing a Sustainability Plan

RESOLUTION NO. 07-160

**A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, URGING PRESIDENT BUSH TO SIGN THE KYOTO PROTOCOL TO THE UNITED NATIONS AND CALLING FOR IMMEDIATE LOCAL AND NATIONAL ACTION TO ADDRESS GLOBAL WARMING; SUPPORTING IMPLEMENTATION OF SARASOTA COUNTY, FLORIDA'S ROADMAP TO SUSTAINABILITY IN THE CITY OF KEY WEST; PROVIDING FOR AN EFFECTIVE DATE**

WHEREAS, the citizens of Key West are concerned about the effects of global warming on the planet, and specifically on their vulnerable, low-lying island home; and

WHEREAS, the United States is the largest single emitter of carbon dioxide from the burning of fossil fuels; and

WHEREAS, the Kyoto Protocol, an agreement negotiated through the United Nations, and ratified by 169 international governmental entities to date, seeks to control and reduce greenhouse gases on a global scale; and

WHEREAS, President Bush has declined to submit the Kyoto Protocol for ratification by United States Congress, citing economic concerns, and an exemption granted to the nation of China, the second-largest emitter of carbon dioxide; and

WHEREAS, it is imperative that the United States and its leaders take prompt action to ensure our future well-being; and

WHEREAS, the City of Key West calls upon President Bush and his Administration to ratify the Kyoto Protocol, and to take immediate action to address the issue of global warming, to

preserve and protect the health, safety and welfare of the citizens of Key West, the United States, and the entire world;

WHEREAS, Sarasota County, Florida has developed a "Roadmap to Sustainability" incorporating principles of the Protocol on a local level that can be instructive to the City of Key West;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, AS FOLLOWS:

Section 1: That President Bush is hereby urged to submit the Kyoto Protocol for ratification, and to lead the United States in the necessary efforts to reduce global warming.

Section 2: That the City Manager is encouraged to develop a similar "roadmap", or utilize the principles of the Sarasota County Plan, to ensure the City of Key West takes an environmentally sustainable approach to the operation of City business.

Section 3: That the City Clerk is hereby authorized to transmit certified copies of this Resolution to President George Bush, Vice President and Senate President Richard Cheney, House Speaker Nancy Pelosi, Senators Nelson and Martinez and Representative Ros-Lehtinen.

Section 4: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held  
this 1 day of May, 2007.

Authenticated by the presiding officer and Clerk of the  
Commission on May 2, 2007.

Filed with the Clerk May 2, 2007.



MORGAN MCPHERSON, MAYOR

ATTEST:  
  
CHERYL SMITH, CITY CLERK

11-2

## APPENDIX

Resolution 07-273 – Undertake 5 Milestone Plan for Carbon Reduction

RESOLUTION NO. 07-273

**A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, COMMITTING TO PARTICIPATION IN THE "CITIES FOR CLIMATE PROTECTION CAMPAIGN"; PROVIDING FOR AN EFFECTIVE DATE**

WHEREAS, a scientific consensus has developed that carbon dioxide and other greenhouse gases released into the atmosphere have a profound effect on the Earth's climate; and

WHEREAS, 162 countries, including the United States, pledged under the United Nations Framework Convention on Climate Change to reduce its greenhouse gas emissions; and

WHEREAS, energy consumption, specifically the burning of fossil fuels, accounts for more than 80% of U.S. greenhouse gas emissions; and

WHEREAS, local government in Key West and the Florida Keys can influence local emissions by exercising legislative powers over land use, transportation, construction, waste management and energy management; and

WHEREAS, local government actions taken to reduce greenhouse gas emissions and increase energy efficiency provide local benefits by decreasing air pollution, creating jobs, reducing energy expenditures and saving money for government, local businesses, and residents as well; and

WHEREAS, the City Commission believes that committing to five milestones to reduce greenhouse gas and air pollution emissions,

set forth in the International Council for Local Environmental Initiatives (ICLEI)'s Cities for Climate Protection Campaign, would serve to protect the health, safety and welfare of the citizens and visitors of Key West;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, AS FOLLOWS:

Section 1: That the City of Key West will undertake the Cities for Climate Protection Campaign Program five milestones to reduce both greenhouse gas and air pollution emissions throughout the community. The five milestones are:

1. Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions in the jurisdiction.
2. Establish a greenhouse gas emissions reduction target.
3. Develop an action plan with both existing and future actions which, when implemented, will meet the local greenhouse gas reduction target.
4. Implement the action plan.
5. Monitor to review progress.

Section 2: That the City of Key West hereby requests assistance from the ICLEI's Cities for Climate Protection Campaign as it progresses through the milestones.

Section 3: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 7 day of August, 2007.

Authenticated by the presiding officer and Clerk of the Commission on August 7, 2007.

Filed with the Clerk August 8, 2007.

  
MORGAN MCPHERSON, MAYOR

ATTEST:  
  
CHERYL SMITH, CITY CLERK

11.3

## APPENDIX

Resolution 08-067- Setting Goal of 15% less Greenhouse Gas Emissions

RESOLUTION NO. 08-067

**A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, DIRECTING CITY STAFF TO REDUCE THE CITY'S MUNICIPAL OPERATIONS GREENHOUSE GAS EMISSIONS BY 15% BY 2015; AND FURTHER SETTING A GOAL OF REDUCING GREENHOUSE GAS EMISSIONS THROUGHOUT THE JURISDICTION OF THE CITY OF KEY WEST BY 15% BY 2015; PROVIDING FOR AN EFFECTIVE DATE**

WHEREAS, in Resolution 07-273, the City Commission committed to five milestones to reduce greenhouse gas and air pollution emissions, set forth in the International Council for Local Environmental Initiatives (ICLEI)'s Cities for Climate Protection Campaign, in order to protect the health, safety and welfare of the citizens and visitors of Key West, and the planet; and

WHEREAS, the first milestone completed was the City of Key West Greenhouse Gas Emissions Inventory Report, which provides a baseline inventory of City energy use and emissions in FY 2005; and

WHEREAS, the second milestone is to set a target for emissions reductions and the third step is to create a Local Climate Action Plan; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, AS FOLLOWS:

Section 1: That the City staff is hereby directed to reduce municipal operations' greenhouse gas emissions by 15%, by the year

2015, based upon the 2005 baseline data contained in the City of Key West Greenhouse Gas Emissions Inventory Report.

Section 2: That City staff is hereby directed to work to develop a Climate Action Plan for reducing greenhouse gas emissions within the jurisdiction of the City of Key West by 15% by the year 2015.

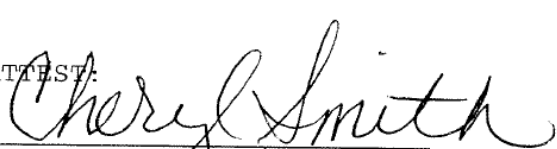
Section 3: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 4th day of March, 2008.

Authenticated by the presiding officer and Clerk of the Commission on March 5, 2008.

Filed with the Clerk March 5, 2008.

ATTEST:

  
\_\_\_\_\_  
CHERYL SMITH, CITY CLERK

  
\_\_\_\_\_  
MORGAN MCPHERSON, MAYOR

11.4

## APPENDIX 4

City of Key West Greenhouse Gas Emissions Inventory

(For electronic version see separate file)

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11.5

## APPENDIX 5

Draft Budget

Preliminary Budget - Climate Action Plan

City of Key West Proposed Projects

(2010 is expected to be able to be funded with little or no over existing approved budget)

Note: Alliances and Partnerships will be sought to share funding; Infrastructure projects have good ROI

	2010		2011		2012		2013		2014		2015		Total 5-Year cost		
	Funding		Funding		Funding		Funding		Funding		Funding				
	Operations	Construction	Operations	Construction	Operations	Construction	Operations	Construction	Operations	Construction	Operations	Construction			
Social Marketing of Energy Conservation and Transit															
Write RFI (staff time)	\$	500											\$ 500		
Write RFP (staff time)	\$	500											\$ 500		
Award RFP															
Web Based Marketing			\$	15,000	\$	10,000	\$	10,000	\$	10,000	\$	15,000	\$ 60,000		
Creative Logo/Theme Campaign			\$	75,000	\$	25,000	\$	25,000	\$	25,000	\$	25,000	\$ 175,000		
Replace Street Lights with LED lights*/solar power															
Feasibility Study (staff time)	\$	5,000											\$ 505,000		
* Proposed grant application															
Energy Savings Performance Contracting															
Feasibility Study (staff time)	\$	5,000											\$ 5,000		
Energy Improvements*															
Stimulus Grant - Solar Park and Ride, Training, Transit					\$275,000	\$	300,000						\$ 575,000		
* Proposed grant application															
City Facilities Energy Optimization/Conservation															
Lighting, Times, Thermostats, Insulation, etc (FMT main budget)				\$	3,000	\$	50,000						\$ 53,000		
Solid Waste Alternatives Study															
Community Composting, Bio-mass, etc (staff time)	\$	5,000											\$ 5,000		
Implementation						\$	300,000						\$ 300,000		
Wind Power Proto Types (2)*				\$	10,000		\$	100,000		\$	1,400,000		\$ 1,510,000		
* Grant available for 50%															
A/C Optimization Sewer Plant **Replacement Already Funded 2009				\$	10,000								\$ 10,000		
A/C Optimization Police Dept **Replacement Already Funded 2009				\$	10,000								\$ 10,000		
Carbon Sequestration Project															
Develop Non-Profit				\$	5,000								\$ 5,000		
Develop Marketing Plan				\$	5,000								\$ 5,000		
Support Non-profit				\$	5,000	\$	10,000	\$	10,000	\$	10,000	\$	10,000	\$ 45,000	
Re-Lamp Grinnell St Parking Garage						\$	75,000						\$ 75,000		
* Proposed grant application															
Carbon Credit Purchase (20,000 mt if needed)											\$	200,000	\$ 200,000		
Vehicle Miles Traveled Reduction															
Bus Ridership Signage, shade, Trash					\$	10,000	\$	10,000	\$	10,000	\$	10,000	\$ 40,000		
Traffic Calming and Bike Facility Improvements (SW budget)		\$	30,000		\$	100,000	\$	100,000	\$	100,000	\$	100,000	\$ 430,000		
Commuter Safe bicycle storage					\$	15,000	\$	15,000	\$	15,000	\$	15,000	\$ 60,000		
Commuter Zip-Bike Rental Program					\$	10,000	\$	5,000	\$	5,000	\$	5,000	\$ 25,000		
Airport/Ferry/Cruise Ship/Street bus ticket sales kiosk machine					\$	15,000							\$ 15,000		
Transit Enhancement Project - Electric Plug-ins*					\$	50,000	\$	50,000					\$ 100,000		
* Proposed grant application															
Environmental Programs Manager - Implementation**	\$	75,000											\$ 75,000		
Staffing Energy Manager & Green Coordinator*				\$	170,000	\$	170,000	\$	170,000	\$	170,000	\$	170,000	\$ 850,000	
* Proposed grant application															
** 70% of existing position															
Operations and Construction Total	\$	91,000	\$	53,000	\$	285,000	\$	1,400,000	\$	215,000	\$	580,000	\$	2,150,000	
Grand Total			\$	144,000	\$	1,685,000	\$	795,000	\$	1,745,000	\$	345,000	\$	420,000	\$ 5,134,000

11.6

## APPENDIX 6

9 inch Sea Level Rise, 11x17

(For electronic version see separate file)

Note:

1. Areas on the US Navy base, although white, were not surveyed and are not included in the rise estimate.
2. College Road and north Stock Island was not surveyed and are not included in the rise estimate.

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11.7

## APPENDIX 7

### Commercial Climate Challenge Showcase Businesses

## Commercial Climate Challenge Showcase Businesses

The following businesses are examples to our community on how energy conservation and other “green” measures can help save the earth and the bottom. These businesses and ones like them will be used in alliances to promote the Climate Action Plan initiatives and meet the City’s Goals.

### Help Yourself! Organic Restaurant

Help Yourself! restaurateur Charlie Wilson’s business model seeks diners who have a social conscience and wish to take care of themselves with organic food and the Earth by minimizing their impact on it. As with all downtown businesses space is an expensive commodity but it is important to them and their customers that their foot print on Earth is friendly, so additional square feet are used to collect rainwater, a/c condensation, collect recyclables and compost.



Water collection from A/c Units to water plants



Composter to create high quality soil for organic gardening



Separate waste receptacles are offered to diners to recycle, compost, and reduce trash leaving the keys



## Southernmost Resorts

Southernmost Hotel, Southernmost on the Beach and La Mer Hotel & Dewey House have all received the prestigious "One Palm Designation" by the Green Lodging Association of Florida. Green lodging is required for any state employees using lodging or hotel conference centers. The resort uses a variety of energy and water conservation measures as well as sustainable development features like salt water tolerant grass since they are water front, ultra low volume toilets and pervious pavement. They may be the first in Key West to use the energy conservation features that are all the rage in Europe, Enter-gize. This system can preset a/c and lighting components of rooms, At Southernmost on the Beach only when the door key is used can the a/c be increased to the desired temperature of the occupant. This save many hours of energy wasted in unoccupied rooms.



Salt tolerant grass and room energy card used to access a/c temperatures



White roofs that reflect 65% of the sun's radiant heat and ultra low flow toilet



A solar pool heating system harnesses the sun's energy.