

Climate Action Plan for Leon County Government Operations

July 8, 2008



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Attachment #1 - Climate Protection Action Plan Strategies

*Attachment #2 - Leon County's Past Efforts to Increase Energy Efficiencies and Reduce
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Attachment #3 - Multi-Modal Transportation District (MMTD)

EXECUTIVE SUMMARY

The Intergovernmental Panel on Climate Change (IPCC), which was created by the United Nations in 1988 and is made up of scientists from 113 countries, issued its Fourth Assessment Report in February, 2007, in which it used its strongest language yet to link human activity to the Earth's warming temperatures, rising seas, more intense storms, and a host of other environmental maladies:

“Most of the observed increase in globally averaged temperature since the mid-20th century is *very likely* due to the observed increase in anthropogenic [human-caused] greenhouse gas concentrations.” The phrase “very likely” translates to a 90% probability, the report’s author’s note.

A. Cities for Climate Protection (CCP) Milestones

Leon County made a commitment in July, 2007 to reduce its greenhouse gas (GHG) emissions through the achievement of the following Cities for Climate Protection (CCP) Milestones:

CCP Milestone 1 - Inventory Its GHG Emission Levels: Achieved March 11, 2008 with the Board’s acceptance of the Greenhouse Gas Inventory for Leon County Government Operations (GHG Inventory), which reported GHG emissions for the base year FY 2006/2007 totaled 22,549.3 tons of carbon dioxide equivalents (eCO₂) from the following sectors: buildings (76%), vehicle fleet (18%), employee commute (5%) and solid waste (1%).

FY 2006/07 GHG Emissions		
Source	eCO ₂ Tons	%
Buildings (energy use)	17205.7	76%
Vehicle Fleet	4114.7	18%
Employee Commute	1004.8	5%
Solid Waste	224.1	1%
Total	22549.3	100%

CCP Milestone 2 - Set a Reduction Target: Achieved May 27, 2008 with the Board’s:

- (1) Acceptance of the “business as usual” forecast that GHG emissions, from County government operations, will increase by 17.8% from the base year FY 2006/2007 and total approximately 26,559 eCO₂ tons in FY 2016/2017 if no actions are taken to reduce such emissions; and
- (2) Commitment to reduce GHG emissions from Leon County government operations as follows:
 - a. 10-Year Target – By FY 2016/2017, reduce emissions by 20% from base year FY 2006/2007 emission levels (which equates to a reduction of 451 tons of eCO₂ annually and 4,510 tons of eCO₂ over the 10-year period); and
 - b. 2050 Target – By FY 2049/2050, reduce emissions by 80% from base year FY 2006/2007 emission levels.

CCP Milestone 3 - Develop a Local Action Plan: The Climate Action Plan for Leon County Government Operations (Plan) specifies near-term strategies to reduce GHG emissions from County government operations by 2% per year, thereby positioning the County to meet its 10-year goal of a

carbon footprint 20% smaller than it was in FY 2006/2007 (Attachment #1). The vision of the Plan is to guide County operations toward a sustainable energy future, that dramatically reduces GHG emissions from its current levels, by focusing on strategies which decrease energy demand, increase energy efficiency, switch to renewable energy and vehicle fuel, reduce vehicle miles traveled, and reduce solid waste through increased reuse and recycling. Prior County initiatives are summarized in Attachment #2.

CCP Milestone 4 - Implement the Local Action Plan: Key elements for successful implementation of the Climate Action Plan will include leadership, funding, communications, training, measurement and reporting. The County Administrator has appointed the following Sustainable Operations Team members to lead the charge with the support of all County divisions and staff: Public Works - Tony Park, Leigh Root, John Pompey, Norm Thomas, and Pat Plocek; Management Services - Kim Dressel, Roshaunda Bradley, Tom Brantley, Carl Morgan, John Ward, Pat Curtis, and Keith Roberts; County Administration - Vince Long, and Shington Lamy; County Commission - Judith Dougherty; Human Resources - Lillian Bennett and Amy Cox; Growth Management - Ray Burroughs; Planning - Wayne Tedder; and Scott Ross - OMB.

CCP Milestone 5 - Monitor the Progress and Report Results: The Sustainable Operations Team will meet at least quarterly and report progress annually to the Board.

While the action strategies itemized in this Local Action Plan are part of a greenhouse gas emissions reduction initiative, it should be emphasized that the actions necessary to reduce greenhouse gas emissions are also sound environmental actions, many of which produce pay back through reduced energy costs. With City of Tallahassee electric rates increasing by approximately 11% per year, and gasoline prices now hovering around \$4 per gallon, gaining efficiencies and reducing demand through cost effective means is fiscally prudent.

B. Climate Action Plan Categories

Strategies to reduce GHG emissions from County operations are outlined in the Plan, grouped by sector. While the County recognizes that its actions in this effort are far too small to impact global GHG emissions trends, it also recognizes that the cost of inaction is high and represents a missed opportunity to: save money, improve sustainability, and inspire other communities and individuals to implement GHG reduction efforts to slow global warming.

- Action Category #1: Reduce GHG emissions from County buildings and facilities, the source of approximately 76% of the County's emissions, through energy conservation measures, solar technology, and other relevant actions.
 - Action Category #2: Reduce GHG emissions from the County's vehicle fleet, the source of approximately 18% of the County's emissions, through more fuel efficient vehicles, alternative and cleaner fuels, modal shifts, and other relevant actions.
 - Action Category #3: Reduce GHG emissions from the County employee's commutes to and from work, the source of approximately 5% of the County's emissions, through modal shifts, electronic conferencing, work scheduling alternatives, and other relevant actions.
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- Action Category #4: Reduce GHG emissions from County employee-generated solid waste, the source of approximately 1% of the County's emissions, through increased recycling and other relevant actions.
 - Action Category #5: Institute policies and procedures that mitigate greenhouse gas emissions from County government operations.
 - Action Category #6: Implement other measures to extend community awareness and enable the County to become better stewards of the environment and meet the needs of the present without compromising the ability of future generations to meet their needs.
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Introduction

A. Global Climate Change – “Very Likely” Man-made and to Continue for Centuries

Achim Steiner, Executive Director of the United Nation's Environmental Programme (UNEP), cautions,

“The implications of global warming over the coming decades for our industrial economy, water supplies, agriculture, biological diversity and even geopolitics are massive. Momentum for action is building; this new report (IPCC’s Fourth Assessment Report) should spur policymakers to get off the fence and put strong and effective policies in place to tackle greenhouse gas emissions.” “In our daily lives we all respond urgently to dangers that are much less likely than climate change to affect the future of our children.”

IPCC’s Fourth Assessment Report, released in early 2007, describes an accelerating transition to a warmer world marked by more extreme temperatures including heat waves, new wind patterns, worsening drought in some regions, heavier precipitation in others, melting glaciers and Arctic ice and rising global average sea levels. For the first time, the report provides evidence that the ice sheets of Antarctica and Greenland are slowly losing mass and contributing to sea level rise. Key conclusions contained in the report’s Summary for Policy Makers include:

- *Global warming is “unequivocal” and it is “very likely” human activity is the main driver, causing most of the rise in temperatures since 1950, and the marked increase in atmospheric concentrations of GHGs carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) since 1750 is the result of human activities. The amounts of CO₂ and CH₄ now in the atmosphere far exceed pre-industrial values going back 650,000 years. Concentrations of CO₂ have already risen by 35% (from a pre-industrial level of 280 ppm to around 379 ppm in 2005) while methane concentrations have risen (250%) from 715 parts per billion (ppb) to 1,774 in 2005.*
- *Global climate is likely to warm 3.5 to 8°F if carbon dioxide concentrations in the atmosphere reach twice the levels of 1750, before the Industrial Revolution. Many energy and environment experts see such a doubling, or worse, as a foregone conclusion after 2050 unless there is a prompt and sustained shift away from the 20th-century pattern of unfettered burning of coal and oil, the main sources of carbon dioxide, and an aggressive expansion of nonpolluting sources of energy. In addition, the report says there is a more than a 1-in-10 chance of much greater warming; a risk that many experts say is*

far too high to ignore. Even a level of warming that falls in the middle of the group's range of projections would be likely to cause significant stress to ecosystems, according to many climate experts and biologists. In addition, it would alter longstanding climate patterns that shape water supplies and agricultural production.

- *The warming has set in motion a rise in global sea levels, the report says.* It forecasts a rise of 7 to 23 inches by 2100 and concludes that seas will continue to rise for at least 1,000 years to come. By comparison, seas rose about 6 to 9 inches in the 20th century.

B. Climate Change in Florida

Changes consistent with the early effects of global warming are being observed in Florida, including retreating and eroding shorelines, dying coral reefs, salt-water intrusion into freshwater aquifers, increasing numbers of forest fires, and warmer air and sea surface temperatures. The National Oceanic and Atmospheric Administration (NOAA) cautions that global warming is expected to make future hurricanes stronger, with “. . . significantly more intense rainfall, than under present day climate conditions and is based on anticipated enhancement of energy available to the storms due to higher tropical sea surface temperatures.” The Florida Climate Alliance and National Resources Defense Council identified the following potential effects of global warming that Florida may experience in the future:

- Coastal property and key tourist's resources damaged by sea level rise.
- Fresh water supplies, agriculture and tourist centers endangered by salt-water intrusion.
- Harm to coastal ecosystems, such as the Everglades and coral reefs, due to the combined effect of sea level rise, rising temperatures, and alterations in rainfall.
- Increased heat-related illnesses and infectious diseases.
- Negative impacts on agriculture, commercial forests, and natural ecosystems.
- More intense weather systems, and heavier, more concentrated rains, along with longer droughts, likely resulting in a decrease of crop yields.
- Substantial threats to both life and tax base if hurricanes become stronger with more intense rainfall.

C. Leon County's Commitment to Reduce its Contribution to Global Warming

Out of concern for the potential negative impacts climate change will have on the local community and beyond, Leon County became a member of the International Council for Local Environmental Initiatives (ICLEI) and committed to participate in its Cities for Climate Protection (CCP) campaign in 2007, thereby joining the ranks of more than 150 cities, towns, and counties in the United States and over 600 municipalities worldwide. In May, 2008, Leon County set a goal to reduce GHG emissions from its operations by 20% by September 30, 2017 and by 80% by September 30, 2050, in comparison with base year FY 2006/2007 emission levels.

The County Administrator appointed a Sustainable Operations Team to develop and lead the implementation of a local action plan thereby positioning the County to achieve its GHG emission reduction targets. The strategies in this Plan are largely based on similar plans

developed by other governmental entities, and reports from the IPCC and other reputable sources.

GHG Emission Trends and Opportunities to Stabilize Atmospheric GHG Concentrations

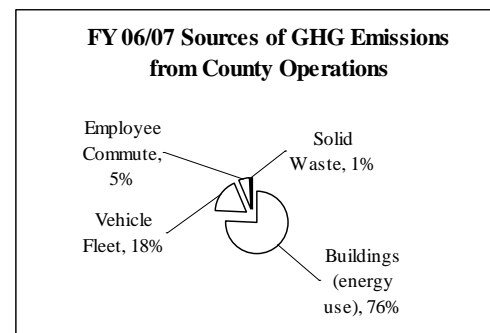
A. Global GHG Emission Trends

While the IPCC emphasizes the need to stabilize and reduce the atmospheric concentrations of eCO₂, historically high rates of anthropomorphic greenhouse gasses are being released globally. To illustrate, between 1970 and 2004: (1) global GHG emissions increased 70%; (2) CO₂ emissions grew by 80% and represented 77% of total anthropogenic GHG emissions in 2004; and (3) the largest growth in emissions came from the energy supply sector (an increase of 145%).

The IPCC emphasized: (1) that atmospheric CO₂ concentrations should not exceed the range of 450-550 ppm by 2050, in order to avoid catastrophic economic consequences associated with an average global temperature rise greater than 2°C; (2) the need to begin reducing total global emissions within ten to fifteen years; and (3) the need to achieve absolute cuts in emissions from developed countries of 60-80% from 1990 levels by 2050.

B. Leon County Government Operation's GHG Emission Trends and Reduction Goals

In March, 2008, the Board approved the GHG Inventory, which established the context within which to assess emission reduction opportunities. The GHG Inventory reported base year FY 2006/2007 GHG emissions totaled 22,549.3 tons of carbon dioxide equivalents (eCO₂) from the following sectors: buildings (76%), vehicle fleet (18%), employee commute (5%) and solid waste (1%).



If actions are not taken to reduce emissions, GHG emissions are projected to increase by 17.8% and total 26,559 eCO₂ by September 31, 2017.

In May, 2008, the Board of County Commissioners set goals to reduce GHG emissions from its operations: (1) by 20% by September 30, 2017; and (2) by 80% by September 30, 2050, in comparison with base year FY 2006/2007 emission levels.

C. GHG Mitigation Technologies and Practices

The IPCC concluded that: (1) no one technology or sector can be completely responsible for mitigating future warming; (2) the range of stabilization levels can be achieved through the deployment of a portfolio of technologies that are currently available and those that are expected to be commercialized in coming decades; and (3) key practices and technologies in various sectors should be implemented to reduce global emissions. Additionally, the IPCC identified the following as the technologies with the greatest potential (those closely linked with County operations are highlighted in bold font, many of which are incorporated in The Plan):

Key Mitigation Technologies and Practices by Sector (IPCC 2007)		
Sector	Currently Commercially Available	Projected to be Commercialized Before 2030
Energy Supply	Improved supply and distribution efficiency; fuel switching from coal to gas; nuclear power; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of CCS (e.g. storage of removed CO ₂ from natural gas)	Carbon Capture and Storage (CCS) for gas, biomass and coal-fired electricity generating facilities; advanced nuclear power; advanced renewable energy, including tidal and waves energy, concentrating solar, and solar PV
Transport	More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorized transport (cycling, walking); land-use and transport planning	Second generation biofuels; higher efficiency aircraft; advanced electric and hybrid vehicles with more powerful and reliable batteries
Buildings	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycle of fluorinated gases	Integrated design of commercial buildings including technologies, such as intelligent meters that provide feedback and control; solar PV integrated in buildings
Industry	More efficient end-use electrical equipment; heat and power recovery; material recycling and substitution; control of non-CO ₂ gas emissions; and a wide array of process-specific technologies	Advanced energy efficiency; CCS for cement, ammonia, and iron manufacture; inert electrodes for aluminium manufacture
Agriculture	Improved crop and grazing land management to increase soil carbon storage; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH ₄ emissions; improved nitrogen fertilizer application techniques to reduce N ₂ O emissions; dedicated energy crops to replace fossil fuel use; improved energy efficiency	Improvements of crop yields
Forestry/forests	Afforestation; reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bio-energy to replace fossil fuel use	Tree species improvement to increase biomass productivity and carbon sequestration. Improved remote sensing technologies for analysis of vegetation/ soil carbon sequestration potential and mapping land use change
Waste	Landfill methane recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimization	Biocovers and biofilters to optimize CH ₄ oxidation

The Climate Action Plan Strategies

In March, 2008, the Board of County Commissioners directed staff to develop an action plan to reduce GHG emissions from County government operations. The Plan serves as the guiding document and planning tool for the County to achieve its GHG emissions reduction goals, while meeting the needs of present and future generations.

The Plan identifies a range of GHG emission mitigation strategies that will reduce forecasted emissions from County government operations (Attachment #1). These strategies focus on the following major sources of GHG emissions: buildings and facilities; vehicle fleet; employees' commutes to and from work; and employee-generated solid waste. The Plan also includes additional strategies to reduce GHG emissions, increase community awareness, and for the County to become better stewards of the environment.

It is important to note that these mitigation strategies are just the first of a series of steps that will be taken over the next forty-three years. It is impossible to know today what new technologies will become commercialized over that time period.

A. Buildings, Facilities and Energy Efficiencies

Energy used to heat, cool, light and otherwise operate County buildings and facilities is responsible for approximately 76% of Leon County's GHG emissions. Therefore, reducing energy demands and increasing energy efficiencies in County buildings and facilities will need to play a major role in the County's strategies to reach its GHG mitigation goals. This focus towards energy efficiencies is consistent with the IPCC's 2007 Climate Change Synthesis Report,

“All assessed stabilization (of atmospheric concentrations of GHGs) scenarios indicate that 60-80% of the reductions (in GHG emissions) would come from energy supply and energy use and industrial processes, with energy efficiency playing a key role in many scenarios.”

Many energy efficiency measures have quick paybacks in terms of reduced energy costs, and significantly reduce GHG emissions. The IPCC identified the following mitigation technologies that are currently commercially available: “Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves, improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycle of fluorinated gases...”

The Plan identifies measures that reduce energy use through decreased demand and increased efficiencies, including for example: performing energy audits; adjusting thermostat settings; making lighting more energy efficient; installing sensors to turn off lights when an area is not in use; setting

office space and office use standards to limit the amount of space required to be developed and operated; supporting only necessary appliances and eliminating the others from County facilities; making appliances more energy efficient when warranted; and replacing, retrofitting, and/or re-commissioning heating, ventilation and air conditioning (HVAC) systems (which includes verification of proper performance regarding equipment and installation, controls, operations and default settings). The Plan includes identification of solar and/or less GHG intensive energy applications; the development of design standards that incorporate energy efficiencies into new construction; and that new construction and renovations will follow LEED or FGBC guidelines.

Lighting produces about 35 percent of the CO2 emissions from the commercial sector. This simple fact, along with an impressive variety of energy-efficient lighting technologies, presents significant opportunities for substantial energy savings. Federal agencies, such as the Department of Energy and the Environmental Protection Agency (EPA), have long recognized the potential for energy improvements in lighting and have sponsored numerous programs to encourage more efficient lighting. To the degree practicable, inefficient ballasts will be replaced with electronic ballasts; T 12 F34 fluorescent lamps will be replaced with T8 F28 lamps or other energy efficient lamps; and incandescent lamps will be replaced with compact fluorescent lamps (CFLs). Lighting will be updated as more efficient lighting becomes available. Additionally, outdoor lighting will be evaluated and replaced with more efficient systems when deemed more cost effective, and exit lights will be retrofitted with LED units. At a minimum, occupancy sensors will be installed in irregularly used areas such as restrooms and in common rooms such as break rooms. Ideally, all spaces should have occupancy sensor controls.

These strategies alone, however, will not position the County to fully achieve its GHG emissions reduction goal in the facilities sector. Additional mitigation strategies will need to be identified in upcoming Plan revisions.

In considering the cost of implementing these initiatives, it is important to note the fiscal impact of increasing electric rates. The City's electric rate structure for Commercial Service, General Service Demand, includes: (1) A customer charge which was \$40/month in October, 1999 and is now \$50/month (a 25% increase); (2) A charge for energy use, which consists of: (a) kilowatt hours (kWh's) consumed; and (b) an energy cost recovery (previously referred to a fuel oil adjustment), that varies with consumption and is applied per kWh (the combined kWh and energy cost recovery rate was \$0.04847 in October, 1999 and is now \$0.10002 (a 106.35% increase); and (3) A charge for the highest rate of energy consumption (expressed in kW), during the billing period-peak demand, is billed based upon the highest thirty minute demand interval for the billing period; the kW rate was \$7.25 in October, 1999 and is now \$9.25 (an increase of 27.59%).

Electric costs for the Courthouse would have been approximately \$35,350.85 under May, 2003 rates and \$54,962.70 under April, 2008 rates (a \$19,612.85 monthly increase, which equates to a 55.48% increase during this five-year period, or 11.1% per year). Annualized, this increase would be \$235,342 for the Courthouse alone.

Est. Electric Charges, Based On May 2008 Courthouse Consumption and Rates in Effect for Various Time Periods (includes 7% Preferred Customer Discount)		
Rate Increases	10/99 - 4/08	5/03-4/08
% Increase	85.51%	55.48%
Periods (Years)	8.5	5.0
Avg. Inc./Year	10.06%	11.10%
\$ Increase	\$ 25,334	\$ 19,612
Annualized \$ Inc.	\$ 304,009	\$ 235,342

B. Vehicle Fleet and Employee Commute

Transportation accounts for approximately 23% of the County's emissions through two sources: (1) its vehicle fleet, which is responsible for 18% of the emissions thereby making it the second largest GHG emissions contributor; and (2) its employees' commutes to and from work, which is responsible for another 5% of the emissions, thereby making it the third largest GHG emissions contributor.

Each gallon of gasoline produces approximately 19.4 pounds of eCO₂ for tank-to-wheel fuel use and 4.6 pounds of eCO₂ for upstream well-to-tank use. According to the EPA, the average passenger vehicle is estimated to annually consume 500 gallons of gasoline and emit 5.5 metric tons of CO₂.

There are three fundamental strategies for reducing vehicle GHG emissions: (1) reduce vehicle miles traveled (VMT); (2) improve fuel economy; and (3) use less GHG-intensive fuels. While reducing VMT curtails GHG emissions, it also helps alleviate other growing problems, such as traffic congestion, and offsets the need for new road infrastructure. Additionally, improving fuel economy and switching to alternate fuels decreases GHG emissions, local air pollution and our dependency on foreign oil.

The IPCC identified the following mitigation technologies that are currently commercially available to reduce GHG emissions from the transportation sector, "More fuel efficient vehicles; hybrid vehicles; cleaner diesel vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorized transport (cycling, walking); land-use and transport planning..."

The Plan identifies measures that include the purchases of more fuel efficient, hybrid and "right-sized" vehicles through the replacement of retired vehicles; the use of bio diesel and alternative fuels; reducing VMT through limiting take home vehicles, mobile technology, teleconferencing and other technologies that can be expanded to reduce VMT. Alternate work schedules are also being considered as a means to reduce emissions, including a four-day work week, which will have the greatest reduction impact on employee commutes.

Staff anticipates current market forces will entice employees to modify their commuter choices when feasible, including the use of a more fuel efficient vehicle, carpooling, biking, walking, or riding public transit. Employees' opportunities in this regard are largely limited by where employees live and where they must travel relative to work and stops to and from work, such as a childcare facility or school. Staff has involved Commuter Services of North Florida to help employees choose the best commute options to meet their needs through services such as Ridematch, which can locate potential carpool partners, and Guaranteed Ride Home, a program that provides fare-free taxi service in cases of emergency for those that use a commute option at least three days per week.

Land-use and transportation planning issues are not addressed in the Plan, as the Plan focuses on GHG emissions from County operations. Nonetheless, Planning and Growth Management divisions are highly involved in development and implementation of initiatives that improve sustainability in these sectors (Attachment #3).

C. Waste - Reduce, Reuse and Recycle

Solid waste produced by employees is estimated to generate 1% of the GHGs emitted by County operations. It is important to note that this estimate is understated, as it does not include emissions from the County’s landfill, or from visitors to the County’s libraries, parks, community centers or other facilities. Further, it does not consider waste as a result from facilities construction.

The IPCC identified the following mitigation technologies that are currently commercially available to reduce GHG emissions from the waste sector, “Landfill methane recovery; waste incineration with energy recovery; composting of organic waste; controlled waste water treatment; recycling and waste minimization...” The County currently has a methane gas recovery system in place at the landfill, and sponsors several waste reduction programs including recycling through the County’s landfill and rural collection center drop-off locations, and hosting composting bin sales.

Recycling reduces GHG emissions in two ways: (1) it keeps materials out of the landfill, thereby avoiding methane emissions (methane has 23 times the climate forcing potential of CO2); and (2) it reduces the emissions associated with the mining, processing, and transportation of virgin resources. The energy savings associated with recycling are summarized in this table. The GHG inventory estimated each County employee, on average, generates approximately one-half ton of solid waste per year. Therefore, it appears there is a good opportunity to reduce GHG emissions through increased recycling.

Recycling - Energy Savings and eCO2 Impacts (per ton recycled)			
Materials	% Energy Reduction	Equivalent Barrel Oil	Tons eCO2 Reduced
Aluminum	95	37.2	13.8
Cardboard	26	2.43	0.04
Steel	61	2.71	1.52
Plastic (PET)	57	11	0.985
Newsprint	45	3.97	-0.03

Source: US Department of Energy

Additionally, it is anticipated the Green Procurement Policy and design standards, which are identified in the Plan, will address issues related to reuse of goods, materials and office space through standardization.

D. Other Sustainability Measures, including Water Conservation, Urban Forestry, and Food Choices

1. Water Conservation - Conserving water also conserves energy and reduces emissions, largely by reducing the volume of water that needs to be treated by wastewater treatment plants. As the County does not operate such plants, water conservation has a limited impact on County operations’ GHG emissions and, consistent with the CCP’s protocol, water use was not included in its GHG Inventory.

Water conservation measures have, however, been incorporated into the Plan as another sustainability measure, rather than as a strategy undertaken by the County to help achieve its GHG reduction goals. Additionally, implementing measures to reduce the amount of water that needs to be heated, chilled or stored at modified temperatures reduces energy use and such actions are included in the buildings and facilities sector.

2. Urban Forestry – The County is responsible for planting and maintaining trees at its parks, right-of-ways, buildings and other facilities. These trees filter pollutants from the air, improve water quality, reduce stormwater runoff, and reduce energy costs. Additionally, carbon removal (sequestration) by trees plays an important role in the global carbon cycle. Trees sequester CO2 from the atmosphere through photosynthesis and return oxygen back to the atmosphere as a byproduct.

Trees then store carbon in their biomass (roots, trunk, branches, and leaves), accounting for about half the dry weight of most trees. The amount of carbon stored increases as trees grow in size. Trees store the carbon until they die or are allowed to decay completely and are considered a “sink” for excess carbon in the atmosphere.

With regard to the Plan, strategically placed trees shade building walls, particularly those containing the most windows, thereby reducing energy consumption and decreasing GHG emissions (heat transmitted through the roof is best reduced by using attic insulation, radiant barriers and ventilation, as tree limbs over the roof can present both a nuisance (litter clogging rain gutters) and a risk of damage or injury should heavy limbs fall off in a storm).

3. Food Choices – Dietary shifts can have a greater impact on one’s carbon footprint than adjustments in modes of transportation. All told, livestock are responsible for more GHG emissions than all the planes, trains and automobiles on the planet. The livestock sector is responsible for 18 percent of greenhouse gas emissions measured in CO₂ equivalent, according to the report *Livestock's Long Shadow - Environmental Issues and Options*, released by the Food and Agriculture Organization of the United Nations (FAO) in 2006. In the report, senior U.N. Food and Agriculture Organization official Henning Steinfeld reports that the meat industry is “...one of the most significant contributors to today’s most serious environmental problems...” and that “...urgent action is required to remedy the situation...” The report found the world's livestock industry "generates 65 per cent of human-related nitrous oxide, which has 296 times the Global Warming Potential (GWP) of CO₂", concluding "that livestock are responsible for 18 percent of greenhouse gas emissions, a bigger share than that of transport." In terms of climate change, livestock are a threat not only because of the gases coming from their stomachs and manure but because of deforestation, as land is cleared to make way for pastures, and the amount of energy needed to produce the crops that feed the animals.

In 2008, researchers from Carnegie Mellon University found:

- (1) replacing red meat and dairy with chicken, fish, or eggs for one day per week reduces emissions equal to 760 miles per year of driving;
- (2) switching to a totally local diet throughout the year is equivalent of driving about 1,000 miles less per year; and
- (3) switching to vegetables one day per week is equivalent of driving 1,160 miles less per year.

These estimates were in comparison with driving a car that gets 25 miles per gallon of gasoline for 12,000 miles per year (the U.S. average), which produces about 4.4 tons of CO₂.

Based on the Carnegie Mellon’s findings, switching to a plant based diet 5 days/week would result in GHG emission reductions roughly equivalent to the level of GHGs emitted from employee work commutes:

- Employees commute to/from work, on average, approximately 5,513 miles/year (based on an average round trip commute of 22.5 miles/day, 5 days/week, and 49 weeks/year).
- Shifting to a plant-based diet 5 days per week would be equivalent to driving 5,800 miles less per year (1,160 miles less per day x 5 days).

To maintain a focus of how our daily food choices impact the climate, the Plan includes the purchase of vegetarian, poultry, and locally grown foods for commission meeting breaks, and excludes the purchase of red meat.

Implementation Strategies

In order to reach its GHG emission reduction goals, Leon County must reduce its GHG emissions by a total of 4,510 tons eCO₂ by September 30, 2017, which represents a 20% reduction from its FY 2006/2007 base year emission level of 22,549.3 tons of eCO₂; and by 18,039 tons eCO₂ by September 30, 2050, which represents an 80% reduction from its FY 2006/2007 emission level. Attachment #1 and the previous sections of the Plan outlined various actions across sectors that could be implemented to reduce GHG emissions from County operations. These actions include continuation of existing activities and programs, as well as initiating new actions that will achieve far greater emissions reductions.

Strategies to implement the Climate Action Plan to reduce GHG emissions from County government operations will include:

- Criteria for Selection of Mitigation Strategies - GHG emission reduction projects, intended to reduce energy consumption and selected by staff for implementation within available funding levels, will: (1) be a strategy identified in this Plan; (2) be historically proven in terms of technology and performance; (3) be projected to reduce GHG emissions from County operations; and (4) meet at least one of the following cost effectiveness criteria:
 - a. Simple Payback Period < Seven Years
 - b. Cost Per Ton of eCO₂ Avoided < \$50.

Strategies not projected to meet the above criteria will not be implemented without specific Board direction. In addition to the substantive criteria above, staff will consider factors such as: life cycle costs, resource availability (including funding, staffing and operational impacts), implementation timeframes, compatibility with existing priorities, end of life disposal, available assistance and support, and visibility.

A recording power meter, which measures energy consumption for various building components, has been purchased and will be used to measure current energy usage. These measures can then be converted to projected dollar savings before the measure is implemented throughout the facility, to assure the above criteria are met prior to implementation. The larger systems will be implemented through energy audits, with savings and pay back periods projected through manufacturers' data and engineering analysis.

- Measurability and Documentation – Documentation developed by projects selected by staff for implementation will include, at a minimum: project description, estimated simple payback period, GHG emission reductions, estimated costs prior to implementation, and actual project costs.

- Plan Implementation (CCP Milestone #4) - The following entities will take responsibility for implementing the Plan upon Board approval:
 - County Sustainable Operations Team: The team will provide general oversight and support for implementation of the plan in all County operations.
 - Public Information Office (PIO): The PIO will assist Sustainable Operations Team in implementing public information campaigns to educate County employees and the public about the County's GHG program.
 - County Departments: All county divisions and departments will assist in implementation of data gathering and appropriate action items for GHG reduction.
- Plan Monitoring and Reporting (CCP Milestone #5) – Staff will continue to track energy consumption and GHG emissions from County operations; assess new opportunities to reduce GHG emissions; and report progress annually to the Board.

The Plan identifies estimated FY 2008/2009 expenditures and includes some FY 2009/2010 cost projections. More precise cost information will be developed as surveys, audits, and studies are conducted and system options are identified and selected. Therefore, funding from one GHG reduction measure may be used to further the implementation of another. It is important to note that out-year funding will be required to continue to implement the Plan, however, the required level of funding has not been fully developed. While the achievement of GHG reduction measures requires substantial up-front investments in terms of staff costs and capital outlay, many of these measures will produce immediate and full pay back in terms of reduced energy costs.