Memorandum

MIAMI-DADE COUNTY

Date: January 25, 2007

Agenda Item No. 12(B)1

To: Honorable Chairman Bruno A. Barreiro, and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: A Long Term CO2 Reduction Plan for Miami-Dade County – 1993 to 2006

The attached report serves to provide the status of measures implemented since the Board approved "A Long Term CO2 Reduction Plan for Miami-Dade County" in December of 1993. The goal of the original plan was to target significant reductions in countywide greenhouse gas emissions by the end of 2005. I am pleased to announce that through projects such as improved energy efficiency, purchase of alternative fuel vehicles, community-wide recycling, increased use of mass transit, incorporation of green building recommendations, and many other projects that are outlined in the report, the County has avoided or sequestered an estimated 34 million tons of CO2 since 1993.

This is only a starting point for Miami-Dade County. With increased electrical usage per household, larger and less fuel-efficient vehicles on our roads, and continuing increases in the County's population, reducing greenhouse gas emissions will remain a challenge for Miami-Dade County. In response to this knowledge, through the continued efforts of Clerk of Courts, Harvey Ruvin, and the sponsorship and support of Commissioner Natacha Seijas with unanimous approval of the Board of County Commissioners, the County has established the Climate Change Advisory Task Force. This Task Force, which will be chaired by Harvey Ruvin, will continue efforts in greenhouse gas reduction and development of adaptation measures that may be needed to minimize the negative effects of expected climate change impacts. It is expected that the report before you today will serve as a foundation for this Task Force and its future efforts. The full text of recommendations made in this report are found in Chapter 4 with a summary version provided as follows:

- Re-evaluate all measures implemented in the Urban CO2 Reduction Plan to identify and prioritize those programs that yield the most effective and measurable results, as well as identify new opportunities.
- Enhance resources available for climate change mitigation and adaptation initiatives by working with additional partners at the local, state, and federal levels.
- Provide adequate staffing and resources to the Climate Change Advisory Task Force and the Sustainable Buildings Committee (sponsored by Commissioner Sorenson) to enable them to move forward in a timely manner and make significant and measurable progress.
- Incorporate development of a new Climate Change Mitigation Plan into the responsibilities of the Climate Change Advisory Task Force.
- Endorse the US Mayor's Climate Protection Agreement (Appendix D) to demonstrate Miami-Dade County's commitment and continued leadership in addressing global warming and climate change. Staff is currently reviewing this Agreement to determine the impacts on Miami-Dade County and will be making a recommendation in the future

- More effectively coordinate and facilitate Miami-Dade County government efforts in sustainable development and operations. A key element of this recommendation will be a single unified annual report for all Miami Dade County environmental efforts so that evaluation amendments and new initiatives can better tie together and become incorporated in the annual plan amendments at budget processes and active strategy performance monitoring programs.
- Consider application for the Florida Green Buildings Coalition's "Green Local Government Designations Standard for Cities & Counties" in order to improve the exposure of the many initiatives already implemented in Miami-Dade County
- Actively provide outreach to the community and encourage additional participation in efforts by Miami-Dade County and our partners to minimize fuel and energy use, reduce greenhouse gas emissions, and adapt to future climate change impacts
- Support efforts to have Congress raise Corporate Average Fuel Economy (CAFE) standards, particularly for SUV's and pick-up trucks.

The Board should also be aware of Resolution No.'s R-1200-05 and R-702-05, sponsored by Commissioner Katy Sorenson and unanimously approved by the Board. R-1200-05 directs the incorporation of sustainable development building measures into County policy for design, construction, renovation and maintenance of County-owned and operated buildings. R-702-05 directs the County Manager to implement the recommendations of the Miami-Dade Resource Conservation Committee (RCC). These initiatives go hand in hand with the County's efforts to reduce greenhouse gas emissions as part of the County's overall goal to create a more sustainable community. As it relates to the RCC, an interim report on the progress of the implementation of the RCC recommendations will be provided at the January INLUC and the 2007 Annual Report will be available in April 2007 as required in R-702-05.

Additionally, DERM is completing a "Green Government" report highlighting past, current, and potential future environmental initiatives being undertaken by County departments. This report is expected to be ready in time for the January INLUC meeting.
All in all, Miami-Dade remains a leader nationwide in environmental initiatives and we will continue to move the agenda forward in a measured and appropriate fashion to our demonstrated needs and available resources.

I wish to personally thank the many participants in this 13-year CO2 reduction effort and express my continued support for this process and other related environmental initiatives.

Assistant County Manager

A LONG TERM CO_2 REDUCTION PLAN
For Miami-Dade County, Florida

"Depending on how we handle the Climate challenge, we are holding in our hands not only the health of our endangered planet, but our future as a civilized species. While history highlights our capacity for greed and destruction...it also highlights, with equal brilliance, our power to nurture, heal and create."

- Ross Gelbspan, Author of "The Heat is On"

"We've known for some time that we have to worry about the impacts of climate change on our children's and grandchildren's generations. But we now know we have to worry about ourselves as well."

-Margaret Beckett, British Secretary of State for Environment (April, 2002)

1993-2006

The Honorable Carlos Alvarez
Mayor

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Department of Environmental Resources Management

December 12, 2006

Many thanks to the following staff for their efforts in preparing this report:
Nichole Hefty, Venu Gandi, Deborah Griner, Ray Baker and H. Patrick Wong

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Executive Summary

On December 14, 1993, the Board of County Commissioners unanimously approved a plan, sponsored by then County Commissioner Harvey Ruvin, entitled "A Long Term CO_2 Emission Reduction Plan for Miami-Dade County," [1] (Plan) recognizing the threat of global warming and creating a program for the County to reduce greenhouse gas emissions. As one of the original 12 local jurisdictions to sign on to the International Council for Local Environmental Initiatives' (ICLEI) Cities for Climate Protection Campaign (CCP), Miami-Dade County has long been considered a pioneer in its efforts to reduce greenhouse gas emissions at the local level. The goal of Miami-Dade County's Plan was to reduce urban CO_2 emissions countywide by 20% of the baseline 1988 levels by the year 2005. This translated into a goal of reducing emissions in excess of 11,000,000 tons of CO_2 each year during this period. In addition to the measures proposed in the Plan, new opportunities to reduce greenhouse gas emissions have also been implemented. These new projects are diverse and include planting of trees, incorporation of green building recommendations, the purchase of alternative fuel vehicles, the utilization of cyber-technology to reduce the trips of county citizens to the courts facilities, and various energy efficiency projects. The County's efforts to reduce greenhouse gas emissions have led to a projected **annual average reduction of 2,532,732 tons of CO_2**. Overall, implementation of the Plan from 1993 to 2005 has resulted in an **estimated total reduction of approximately 34,062,831 tons of CO_2**.

Despite these positive results, Miami-Dade County's total Carbon dioxide gas emissions have increased by over 8.5 million tons annually in the last 17 years (1988 vs. 2005), which is equivalent to an increase of 36.5% annually. There are several factors contributing to this increase, including an increase in the County's population of 27.1%, an increase in electrical usage per household resulting from larger homes and personal electronics, the advent and proliferation of SUV's, and an absence of stricter national Corporate Average Fuel Economy (CAFE) Standards. As a result, our per capita emissions have increased a total of 8%, from 12.5 tons to 13.5 tons of CO_2 per person per year .

Overall, despite the outcomes mentioned above, the County's efforts have been successful. As a direct result of the implementation of the Plan, the County's CO_2 emissions reductions are estimated to be approximately 34,062,831 tons during the aforementioned period (1988 – 2005). In addition, as a pioneer, Miami-Dade County has tackled many obstacles, learned many lessons, and gained valuable experience. This experience has provided a head start to other jurisdictions that have since begun implementing Climate Change mitigation programs of their own. Furthermore, this experience has provided a sound foundation upon which Miami-Dade County will continue to build upon in its future efforts towards climate change Mitigation and Adaptation Planning.

On July 18th, 2006, Miami-Dade's Board of County Commissioners established the Climate Change Advisory Task Force (CCATF) to facilitate further greenhouse gas reduction efforts, provide technical assistance, and make recommendations regarding adaptation measures that may be needed to minimize the negative effects of expected climate change impacts. This task force will be chaired by now Miami-Dade County Clerk of Courts Harvey Ruvin, and will be comprised of twenty-five appointed members who have demonstrated knowledge or experience in areas that will facilitate the work of the CCATF. The Climate Change Advisory Task Force will begin meeting in early 2007 and has been tasked with reporting back initial findings and recommendations to the Board of County Commissioners by October 2007.

Chapter 1

Background

Global warming, the progressive gradual rise of earth's average surface temperature caused in part by increased concentrations of greenhouse gases (GHG) in the atmosphere, and Climate Change, the long-term trends in the average climate, such as changes in average temperatures due to natural variability or as a result of human activity, are two focuses in the long-term and short-term planning of the County.

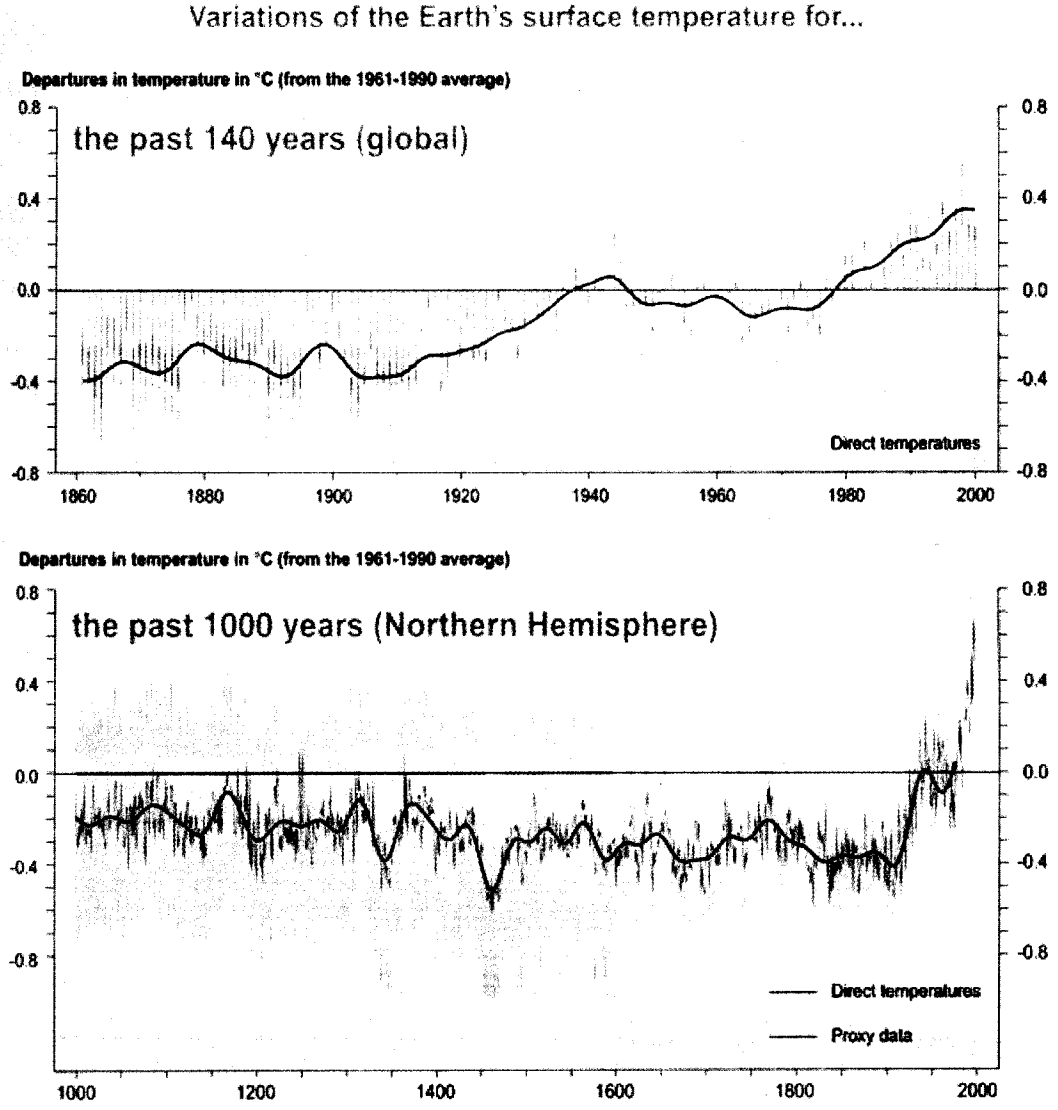
The United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) convened the Intergovernmental Panel on Climate Change (IPCC) in 1988. The IPCC is an international network of approximately 2,500 scientists engaged in atmospheric research under the United Nations Secretariat dealing with climate change, and is considered one of the primary international authorities on global climate change. A primary role of the IPCC is to prepare a periodic comprehensive and up-to-date assessment of policy-relevant scientific, technical and socio-economic information relevant to the understanding of human induced climate change, potential impacts of climate change, and options for mitigation and adaptation. The most recent IPCC report on climate change, Assessment Report 3 (AR3), was published in 2001. It concluded that the global average surface temperature increased by about 0.6 ± 0.2°C which is equivalent to approximately 1°F during the 20th century. It also concluded that most of the warming of the past 50 years is probably due to increases in greenhouse gas concentrations in the atmosphere. Graphic representations of these findings are illustrated in the figures SPM-2 and SPM-2.3 below, published in the aforementioned IPCC AR3 "Climate Change 2001: Synthesis Report – Summary for Policy Makers" [2]

Discussion of Figure 2-3 (as presented in the IPCC AR3)

The Earth's surface temperature has increased by about 0.6 degree Centigrade over the record of direct temperature measurements (1860-2000, top panel) – a rise that is unprecedented, at least based on proxy temperature data for the Northern Hemisphere, over the last millennium (bottom panel). *In the top panel the global mean surface temperature is shown year-by-year (red bars with very likely ranges as thin black whiskers) and approximately decade-by-decade (continuous red line). Analyses take into account data gaps, random instrumental errors and uncertainties, uncertainties in bias corrections in the ocean surface temperature data, and also in adjustments for urbanization over the land. The lower panel merges proxy data (year-by-year blue line with very likely ranges as grey band, 50-year-*

average purple line) and the direct temperature measurements (red line) for the Northern Hemisphere. The proxy data consist of tree rings, corals, ice cores, and historical records that have been calibrated against thermometer data. Insufficient data are available to assess such changes in the Southern Hemisphere. (See Heading for source)

FIGURE 2-3

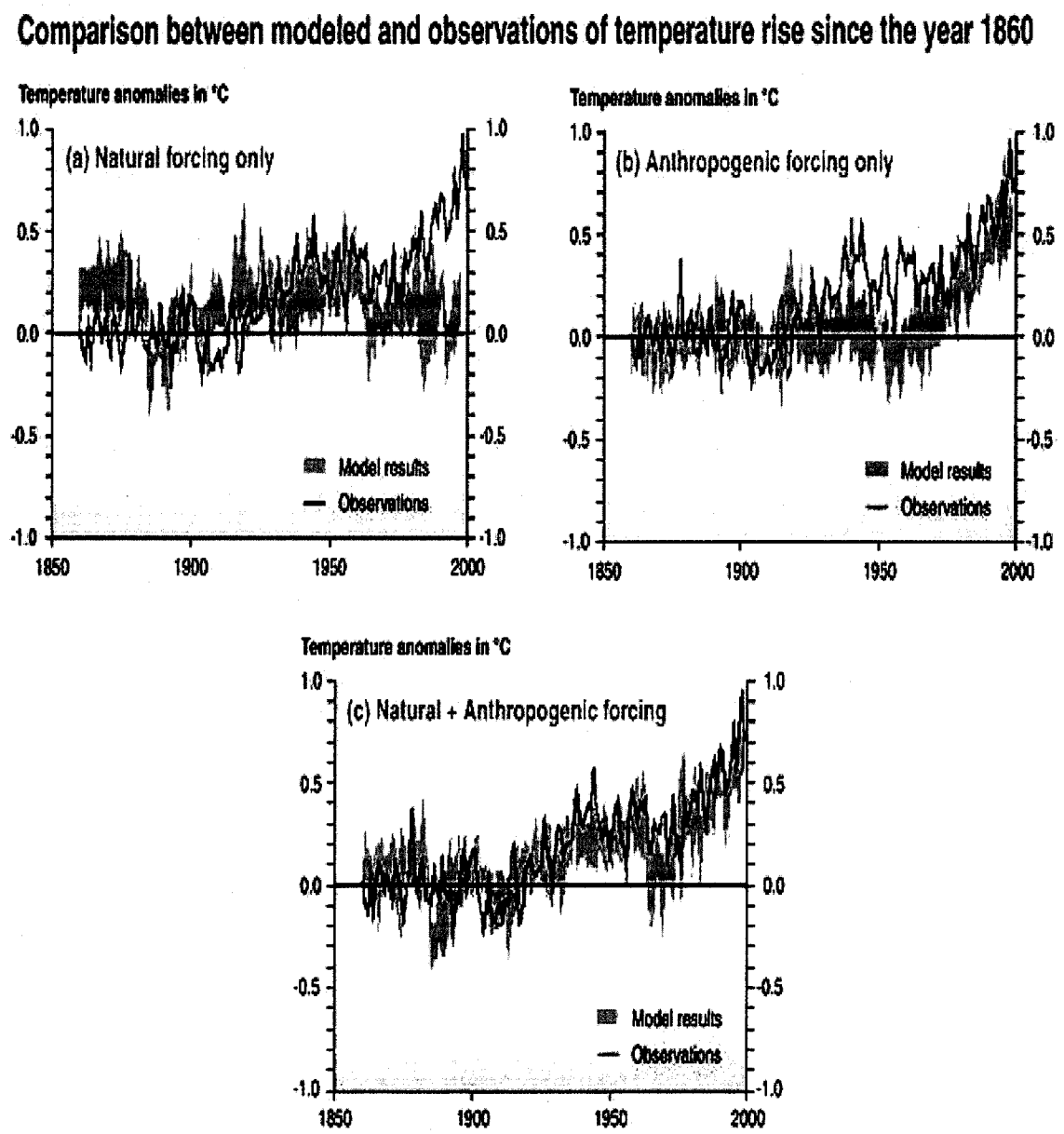


Discussion of Figure SPM-2 (as presented in IPCC AR3)

Simulating the Earth's temperature variations (°C) and comparing the results to the measured changes can provide insight to the underlying causes of the major changes. *A climate model can be used to simulate the temperature changes that occur from both natural and anthropogenic (man made) causes. The simulations represented by the band in (a) were done with only natural forcings: solar variation and volcanic activity. Those encompassed by the band in (b) were done with anthropogenic forcings: greenhouse gases and an estimate of sulfate aerosols. And those encompassed by the band in (c) were done with both natural and*

anthropogenic forcings included. From (b), it can be seen that the inclusion of anthropogenic forcings provides a plausible explanation for a substantial part of the observed temperature changes over the past century, but the best match with observations is obtained in (c) when both natural and anthropogenic factors are included. These results show that the forcings included are sufficient to explain the observed changes, but do not exclude the possibility that other forcings may also have contributed. (See Heading for source)

FIGURE SPM-2



At this time, drafts of the IPCC Working Groups are currently under review and the fourth assessment report (AR4) is expected to be available in 2007.

In addition, scientists have already observed changes in Florida that are consistent with the early effects of global warming. These changes include retreating and eroding shorelines, dying coral reefs, salt water intrusion into freshwater aquifers, increasing numbers of forest fires, and warmer air and sea surface temperatures. Studies and evidence gathered by the National Oceanic and Atmospheric Administration (NOAA) and other scientists indicate that global warming is expected to make future hurricanes stronger, with "...significantly more intense rainfall, than under present day climate conditions." This expectation is stated on the "Global Warming and Hurricanes" section of NOAA's Geophysical Fluid Dynamics Laboratory webpage[3] and is "...based on anticipated enhancement of energy available to the storms due to higher tropical sea surface temperatures." In coming years, these effects may become more common, and increasingly severe.

Some of the potential effects of global warming that Florida may experience in the future were explained in a report entitled "Feeling the Heat in Florida: Global Warming on the Local Level,"[4] prepared by the Florida Climate Alliance and the National Resources Defense Council. These potential effects include:

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

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

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

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

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

ICLEI and Cities for Climate Protection Campaign

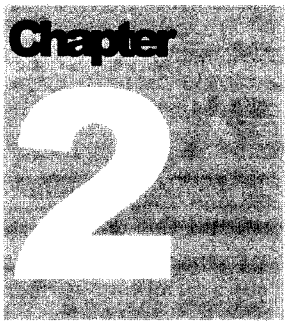
In 1990, the International Council for Local Environmental Initiatives (ICLEI) was established through a partnership with the United Nations Environment Program and the International Union of Local Authorities (IULA) to build a worldwide movement of local governments whose collective efforts could have a tangible impact on global environmental and sustainable concerns, thereby "thinking globally and acting locally.' ICLEI's first global campaign focused on climate change and Miami-Dade County was one of 12 North American and European jurisdictions selected to conduct a pilot project called the "CO_2 Emission Reduction Project." The purpose of this pilot project was to establish reliable methods to estimate annual greenhouse gas emissions occurring in each of the participating communities, establish a reduction goal over a specific period of time, identify methods and practices to achieve the goal, and put in place the process to monitor results. Four specific areas of local government activity were the focus of this effort: transportation, solid waste management, electrical production and consumption, and urban design. Computer models were developed to estimate greenhouse gas emissions, and planning methods were standardized for broader application. Each jurisdiction appointed an elected official, an administrative official, and a scientific expert to lead the local study teams. A committee of business, academic, and governmental representatives was appointed to review the study and advise the County as the study progressed. The County received a grant from Public Technology, Inc. (now the Public Technology Institute) to provide staff support for the development of the plan. Hurricane Andrew interrupted the study work, which had originally been planned for completion in 1992. The plan, entitled "A Long Term CO_2 Emissions Reduction Plan for Miami-Dade County" was completed and approved by the County Commission in December of 1993 and the County became an official member and a leader of ICLEI's Cities for Climate Protection (CCP) Campaign. At this point the study advisory committee disbanded and the Department of Environmental Resources Management (DERM) was given the responsibility of administering the Plan and providing periodic progress updates.

ICLEI's CCP campaign continues to offer technical assistance, training, publications and marketing tools to support the implementation of programs and policies which improve energy efficiency and result in greenhouse gas emissions reductions in all sectors: buildings, manufacturing and industrial facilities, municipal fleets, waste management, land-use planning, renewable energy applications, transportation, and local government operations. According to the "ICLEI USA Year in Review 2005"[5], more than 650 local governments worldwide participate in the Campaign, including over 165 cities and counties in the United States, representing over 55 million Americans. Through their efforts, approximately 23 million metric tons of greenhouse gas emissions are being reduced annually in the United States alone.

In 1992, the United Nations Conference on Environment and Development (UNCED), also called the "Earth Summit," was the largest diplomatic gathering in history, with 190 heads of state in attendance. Several important documents were signed and the framework for a United Nations Secretariat on climate change was set in motion, including an annual Conference of the Parties (COP). In 1997, the parties met in historic Kyoto, Japan, and created what is referred to as the Kyoto Protocol. The objective of The Kyoto Protocol[6] is to stabilize and reduce greenhouse gas (GHG) emissions, mitigate climate change, and promote sustainable development. The Protocol is historic in that it is the first attempt to achieve international agreements to mitigate global climate change through reduction in greenhouse gases, and the first to employ the flexibility of the global market place for global environmental management. The Protocol emerged first as a framework agreement in 1992, but through international negotiations it has progressed into sets of legal articles. These impose obligations on all signatories, but they also identify opportunities for improved environmental land management at local, national and international levels. The Protocol sets targets and deadlines for the industrial nations as a first step towards later leading the developing nations towards clean energy futures.

The Protocol is subject to ratification, acceptance, approval or accession by Parties to the Convention. The final document states that the Protocol "shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Annex I Parties which accounted in total for at least 55% of the total carbon dioxide emissions for 1990 from that group, have deposited their instruments of ratification, acceptance, approval or accession"[7]. Although the United States has yet to ratify the Protocol to date, it was internationally adopted on February 16th, 2005, when Russia signed the Treaty. As of July 2006, a total of 164 states and regional economic integration organizations have deposited their instruments of ratifications, accessions, approvals, or acceptance.

In addition to those city and county governments formally involved in ICLEI's CCP Campaign, many others have begun taking actions to curb greenhouse gas emissions on their own initiative. One of the most visible examples of this is the US Mayors Climate Protection Agreement[8] passed on June 13, 2005. This Agreement, endorsed by the US Conference of Mayors, is a call to local governments to take actions in their own operations and communities in an effort to reach or exceed the Kyoto Protocol targets for reducing global warming pollution. As of October 12, 2006, 319 mayors from across the nation had already signed on to this Agreement. Another example of efforts in the United States to reduce impacts to global climate change is the increased participation in voluntary greenhouse gas emission registry and reduction programs, such as the California Climate Action Registry (CCAR) and the Chicago Climate Exchange (CCX). Members of these organizations include local government as well as many notable private sector businesses. By way of information, the administration under direction from the INLUC committee is currently investigating the potential membership for Miami-Dade County in Chicago Climate Exchange (CCX). Therefore, efforts at the local level are increasing to reduce the impact of the United States on global climate change.



Program Results 1993 - 2005

This chapter summarizes the overall results of Miami-Dade County's efforts over the past 13 years of implementing measures to reduce emissions of Greenhouse gases, namely carbon dioxide (CO_2). Specific initiatives that were identified in pursuit of CO_2 emission reductions are categorized into four sectors, as per the County's CO_2 Reduction Plan. These categories are Transportation, Land Use, Electrical Production/Use, and Solid Waste. Background information about emissions from the various sectors is also included to provide an overall picture for Miami-Dade County.

Emissions Calculations Using Cities for Climate Protection Software

This section presents a comparison of CO_2 emissions inventories between the baseline year of 1988, and the final year of implementation, 2005. The emissions inventory in 1988 was carried out using the Total Emissions Model for Integrated Systems (TEMIS) software developed by the OKO Institute and the University of Kassel Environmental Systems Analysis Group. The TEMIS software calculates direct CO_2 emissions associated with the combustion of various fuel types. It was a full cycle model, and therefore includes upstream emissions associated with the production, refining, and transport of the fuels (such as coal, natural gas and oil) to the end user, as well as the emissions that actually occur at the point of end use when the fuel is burned. The Cities for Climate Protection (CCP) software was used to calculate the emissions inventory through 2003 and the Clean Air and Climate Protection (CACP) Software was used to calculate emissions for 2004 and 2005. The CCP & CACP Software programs were created by Torrie Smith Associates, Inc., and designed specifically for members of ICLEI's Cities for Climate Protection, but are not full cycle models and therefore do not include the upstream emissions. These software programs have made it possible for many local governments, such as Miami-Dade County, to quantify their greenhouse gas emissions and develop local climate action plans. The more recently developed CACP software tracks initiatives that are implemented by County agencies as well as community projects, calculates greenhouse gas emissions from energy use and solid waste, and quantifies air pollutant reductions and other co-benefits of greenhouse gas reduction strategies.

When comparing results from year to year, it is important to consider the evolution of the software and methodologies utilized to calculate the baseline versus the annual emissions reductions. Much has been learned since the beginning of the Cities for Climate Protection

Campaign. Since the emissions reductions calculation software that has evolved over the years allows the use of a greater number of variables in the calculation of greenhouse gas emissions, the more recent software versions can be considered more accurate. As a result, the 1988 baseline CO_2 emissions calculated using the TEMIS software might be 10% to 15% higher when compared with the results of the CACP software, which does not include upstream emissions in the calculations.

Emissions Inventories

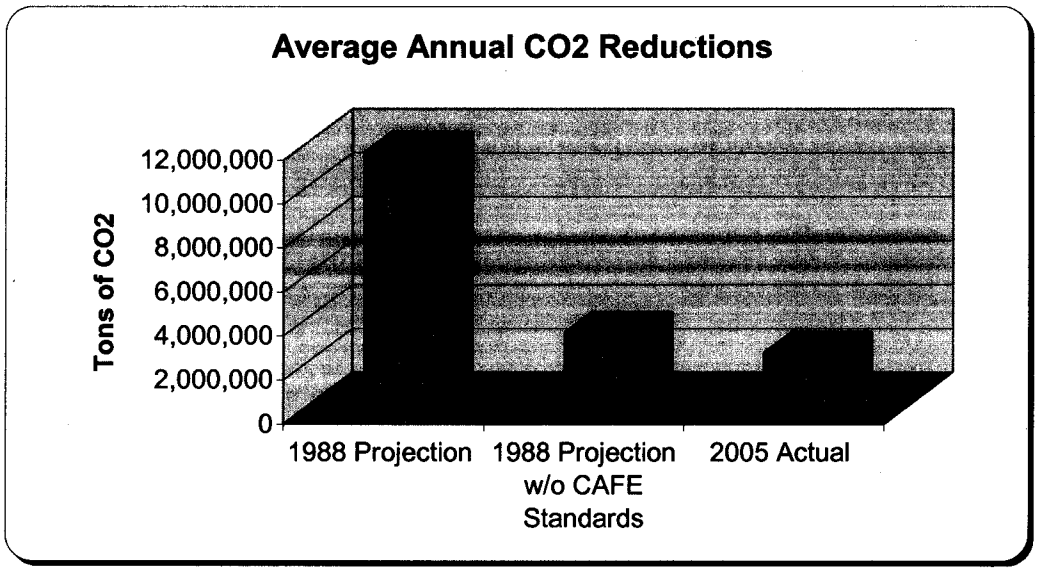
SECTOR	1988 Equivalent Million Tons of CO_2		2005 Equivalent Million Tons of CO_2		Difference Million Tons of CO_2
Residential	0.196	1%	0.227	1%	0.031
Commercial	1.022	4%	0.681	2%	-0.341
Industrial	1.297	6%	1.554	5%	0.257
Transportation	10.449	45%	14.057	44%	3.608
Electrical Usage*	10.459	45%	15.448	48%	4.989
Others	0	0%	0	0%	0
Total	23.423	100%	31.967	100%	8.544

** The CO_2 emissions factor for Miami-Dade County, which is published by FPL every year, is used for emissions calculations.*

When emissions were originally calculated for the Urban CO_2 Reduction Plan, total CO_2 emissions for Miami-Dade County were projected to be approximately 30.226 million tons in 2005, which would have been an increase of roughly 29% from the calculated 1988 baseline. As illustrated in the table above, Miami-Dade County's overall greenhouse gas emissions have increased by over 8.5 million tons in the last 17 years to 31.967 million tons, which is equivalent to an increase of approximately 36.5%. There are several factors contributing to this increase. One factor contributing to this is an increase in electrical usage per household, resulting from larger homes, as well as an increase in personal electronics in those homes. Another significant factor is the advent and proliferation of SUV's and other fuel-inefficient vehicles, which is due, in part, to the absence of stricter national Corporate Average Fuel Economy (CAFE) Standards. Locally, several additional issues have compounded these factors, including an increase in the County's population of 27.1%, continued growth of the county towards the west, where hotter temperatures are experienced during the summer, and a tremendous construction boom over the past several years. As a result, the County's per capita emissions have increased a total of 8%, from 12.5 tons to 13.5 tons of CO_2 annually during the same 17 years.

Summary of Overall Annual CO_2 Emission Reductions

	Average Annual tons of CO_2 Reduced
1988 Projection	**11,648,610**
1988 Projection w/o CAFE Standards	**3,448,610**
2005 Actual	**2,532,732**

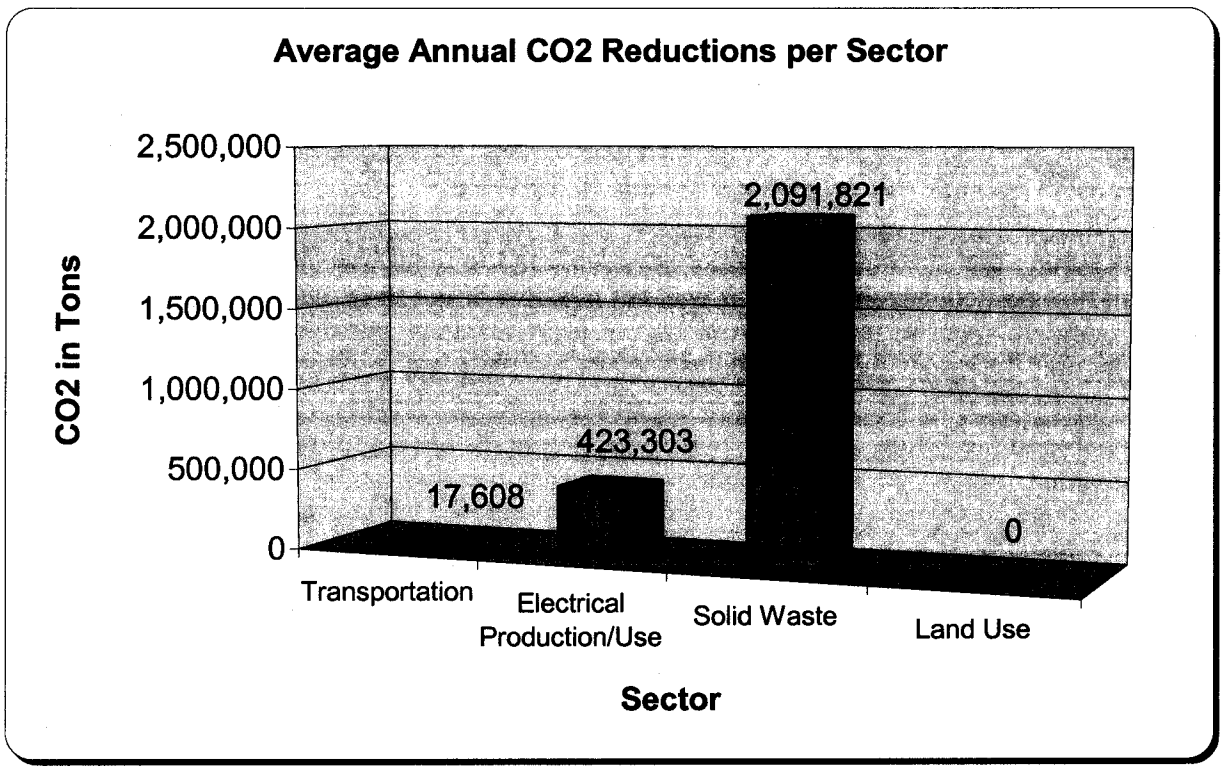


It is important to discuss the reasons why Miami-Dade County did not meet its original projected emissions reductions target of 11,648,610 tons per year. In addition to the several factors mentioned above in the Emissions Inventory section, there is one overriding factor that significantly impeded the attainment of the original goal. When the Urban CO_2 Reduction Plan was being developed, a 1991 national poll indicated "...65% of Americans favored higher fuel efficiency standards."[9] and it was anticipated that the national CAFE standards would be increased to 45 miles per gallon (mpg) from the 27.5 mpg standard at that time. This measure was seen as "...the single largest opportunity to reduce emissions"[10] which resulted in an anticipation that this measure alone would lead to over 8,000,000 tons of CO_2 emissions reductions annually. This comprised approximately 70% of the total 11,346,610 tons of CO_2 emissions reductions projected annually for Miami-Dade County's Urban CO_2 Reduction Plan. Despite efforts at the local and federal levels, the CAFE standards were not increased, thereby greatly impeding Miami-Dade County's ability to accomplish the target of a 20% reduction in local CO_2 emissions. Therefore, if this measure is removed from the calculations, the results are much different. The actual annual emissions reductions of 2,532,732 achieved by 2005 are significantly closer to a revised goal of 3,448,610, which is the projected goal when the anticipated emissions reductions from the increased CAFE standards are omitted. Although not ideal, this situation provides a valuable lesson for future climate change mitigation plans: It is advisable in future plans to avoid relying so heavily on a measure that is completely out of

a jurisdiction's control, particularly when it is a legislative issue controlled at the federal level. Consequently, when future emission reduction goals are set for Miami-Dade County, care will be taken to avoid including projected reductions that are so uncertain.

Summary of Annual Average CO_2 Emissions Reductions by Sector

Sector	Annual Tons of CO2 Reduced	%
Transportation	17,608	0.7%
Electrical Production/Use	423,303	16.7%
Solid Waste	2,091,821	82.6%
Land Use	0	0%
Total	2,532,732	100%



The chart and table above summarize annual average CO_2 emission reductions by the sectors identified in the original Plan. Details for emissions reductions for each measure implemented are provided in Chapter 3, the Sector Update. In general, it is apparent that emissions reductions in the solid waste sector comprise the majority of the total reductions. This is primarily due to community-wide recycling programs in the residential and commercial sectors, as well as methane recovery and flaring at the two main county landfills, and methane recovery and use at county wastewater treatment facilities. It is interesting to note that this sector achieved the most success in overall emissions reductions, despite the fact that it comprised less than 10% of Miami-Dade County's CO_2 emissions in 1988, and less than 8% of Miami-Dade County's CO_2 emissions in 2005.

These percentages are based on the relative percentages of CO_2 overall emissions contributed by the residential, commercial, and industrial sectors combined, since solid waste is a component of those sectors. It is important to note that the County's recycling program is currently under review to achieve even greater efficiencies in the curbside collection program.

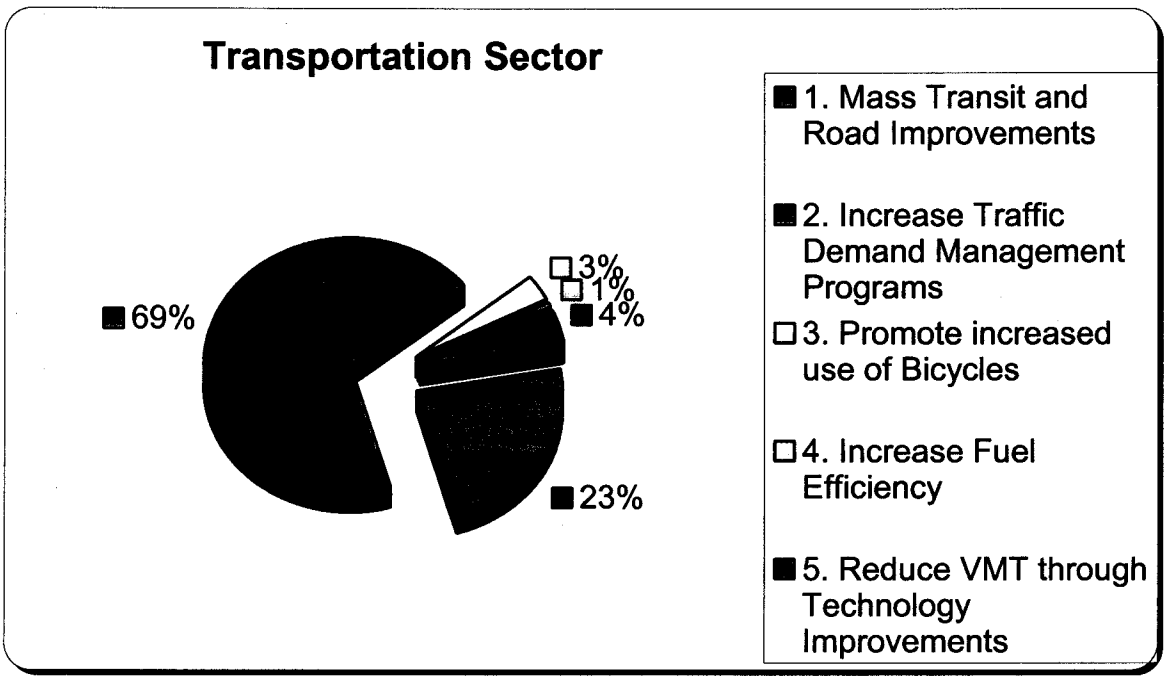
Conversely, measures in the Electrical and Transportation Sectors comprised a relatively small percentage of emission reductions, compared to their relative contributions to overall CO_2 emissions for Miami-Dade County. When the 1988 baseline was calculated the Electrical and Transportation Sectors made up the bulk of CO_2 emissions, each contributing approximately 45% of Miami-Dade County's overall emissions. These emission rate percentages remained relatively comparable for 2005, when emissions from the Electrical Sector comprised approximately 48% of the total emissions, and emissions from the Transportation Sector were approximately 44% of the total. However, measures implemented in these areas constituted less than 20% combined of the CO_2 emissions reduced through implementation of the Plan. Since some of the emissions reductions achieved in these sectors have resulted from programs that were relatively recently implemented, such as the RFQ-25 Energy Efficiency Retrofit Program and the purchase of alternative-fueled vehicles, it is anticipated that emissions reductions in these two important sectors will increase appreciably in the future.

It is certain that the measures that are available in the Land Use Sector effectively result in emission reductions. However, it was not possible at the time that this Report was written to calculate specific numbers from the various revisions and amendments to the County Code and Comprehensive Development Master Plan that promote transit and pedestrian-oriented (TOD) development. It is hoped that specific emission reduction numbers will be available in the future as these types of developments are completed and raw data becomes available.

More specific details for emissions reductions from each sector follow below and in Chapter 3, Program Measure Updates.

a) Transportation Sector

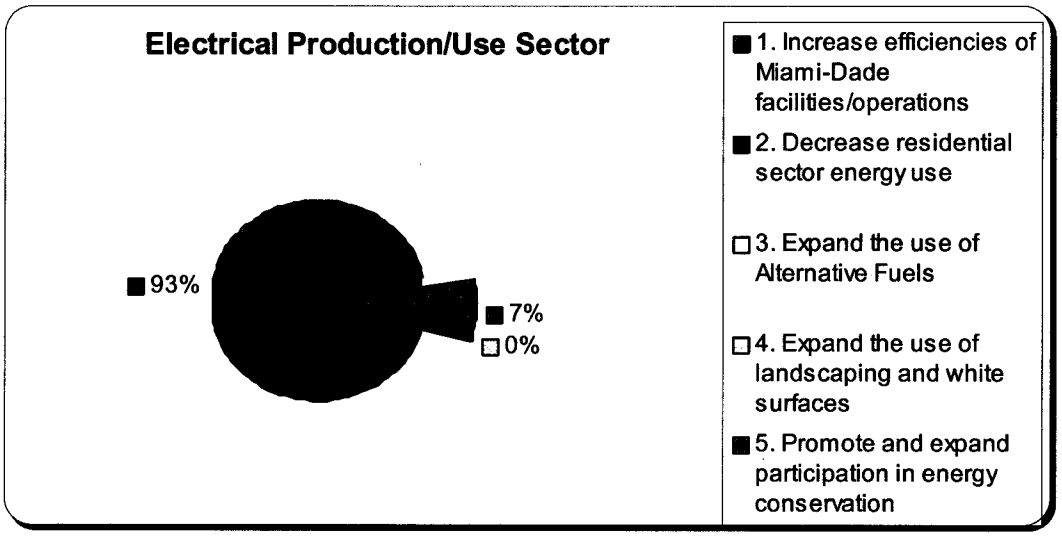
Transportation Sector Measure	Tons of CO_2 Reduced	%
1. Mass Transit and Road Improvements	4,099	23
2. Increase Traffic Demand Management Programs	12,069	69
3. Promote increased use of Bicycles	585	3
4. Increase Fuel Efficiency	104	1
5. Reduce Vehicle Miles Traveled (VMT) through Technology Improvements	751	4
Transportation Total	17,608	100



Traffic Demand Management programs and mass transit improvements made up the majority of emission reductions in the Transportation Sector. In fact, increasing Traffic Demand Programs was responsible for almost two-thirds of the reductions realized in the transportation sector, primarily resulting from the carpooling programs offered by the South Florida Commuter Services Program. It is expected that mass transit and road improvements will make a more significant impact in the future as Miami-Dade County continues to expand and improve its mass transit and road systems with additional funding provided by the half-penny sales tax passed in 2002. The contribution of emissions reductions from fuel efficiency was not as great as expected, primarily because of the absence of stricter CAFE standards. However, Miami-Dade began actively integrating alternative fueled vehicles into its passenger vehicle fleet in 2002 and will continue to expand this hybrid vehicle fleet into the future. In addition, Miami-Dade County Transit has recently purchased two hybrid buses and plans to have in excess of 200 hybrid buses in its Metrobus fleet by 2012. Therefore, it is anticipated that emissions reductions from the Transportation Sector will comprise a greater percentage of the County's overall emissions reductions in future years.

b) Electrical Production/Use Sector

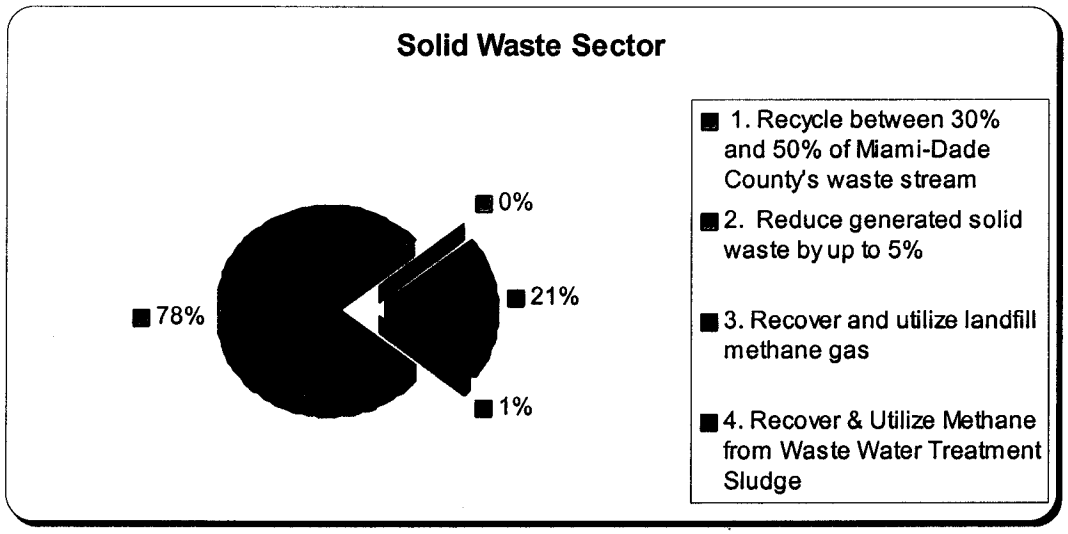
Electrical Production/Use Sector Measure	Tons of CO_2 Reduced	%
1. Increase efficiencies of Miami-Dade facilities/operations	29,698	7.016
2. Decrease residential sector energy use	141	0.033
3. Expand the use of Alternative Fuels	0	0.000
4. Expand the use of landscaping and white surfaces	445	0.105
5. Promote and expand participation in energy conservation	393,019	92.846
Electrical Production/Use Total	**423,303**	**100**



In the Electrical Production/Use Sector almost all measurable emissions reductions have occurred since 1999. This is primarily due to a dramatic increase in participation in FPL's Demand Side Management Program since 2000, and energy use reduction resulting from energy efficient retrofits in County-operated buildings, starting in 2002. Since the County has been able to reduce over 29,000 tons of CO_2 annually through energy efficiency measures implemented since 2002, the potential for increased reductions in this sector is apparent. This is particularly true in that Miami-Dade County passed Resolution R-1200-05[11] in October 2005, establishing Sustainable Development Building Measures as a policy for all county-owned buildings constructed or renovated in the future. The U.S Green Building Council's[12] Leadership in Energy and Environmental Design (LEED) is the standard under consideration for these buildings. Therefore, it is anticipated that increased efficiencies of Miami-Dade County facilities and operations will comprise a higher percentage of reductions in the Electrical Production/Use Sector in the future.

c) Solid Waste Sector

Solid Waste Sector Measure	Tons of CO2 Reduced	%
1. Recycle between 30% and 50% of Miami-Dade County's waste stream	1,625,588	78
2. Reduce generated solid waste by up to 5%	0	0
3. Recover and utilize landfill methane gas	449,536	21
4. Recover & Utilize Methane from Waste Water Treatment Sludge	16,697	1
Solid Waste Total	2,091,821	100



Overall, efforts to reduce CO_2 emissions in the Solid Waste Sector have met with the most success during implementation of the Urban CO_2 Reduction Plan. Although the recycling rates have declined from 24% when the Urban CO_2 Reduction Plan was published in 1988, to 18% in 2004, the Department of Solid Waste Management is still providing service to over 330,000 households and recycling over 709,000 tons of solid waste annually. This, combined with the benefits of flaring the methane at the two primary landfills in the County, results in over 2 million tons of CO_2 reduced each year. This is particularly notable in light of several hurricanes that have affected South Florida over the past few years, putting a significant strain on solid waste management in Miami-Dade County. In addition, recovery of methane at two of the County's wastewater treatment facilities further reduces CO_2 emissions since this methane is used for fuel at these plants.

In general, the amount of waste reduced, or not created, is much more difficult to quantify than the amount of waste produced or recycled. This is particularly true if a waste reduction program primarily consists of education and outreach. Although emission reductions are certain to have resulted from the County's waste reduction outreach efforts, they remain unquantifiable and the need to reinvigorate these efforts is clear.

d) Land Use Sector

The Land Use Sector contains several measures that have a very broad impact on Miami-Dade County's emissions overall, since they affect the distribution and type of development that occurs. However, many of the projects resulting from various regulation and code changes are in the early stages of construction or development and therefore, the benefits have not yet been realized. In addition, some of the data necessary to calculate CO_2 emissions reductions from these measures are either not technically available or not collected, and therefore, calculations were not possible at the time this report was written. It is anticipated that more data and results will be available in the future, as Miami-Dade County moves forward in its sustainable development initiatives and more effort is applied to collect and tabulate data.

Chapter

Program Measure Updates

This section provides brief updates on the projects that have been proposed and/or implemented during the thirteen (13) years of the Miami-Dade County Urban CO_2 Reduction Program. The numbering of the projects in this chapter correlates to the numbering of measures proposed in the Urban CO_2 Reduction Plan and is also reflected in the Summary Chart of Sector Measures and Associated CO_2 Emission Reductions located at the end of this chapter. New projects identified during implementation of the Plan have been added in the appropriate sectors and sections. If a particular department is known to be actively involved or responsible for implementation of a measure it is listed in parenthesis beside the title of the measure. A key to department abbreviations can be found in Appendix C.

TRANSPORTATION SECTOR

Miami-Dade County continues to face many challenges associated with transportation issues. These challenges are succinctly stated in the "Transportation Component"[13] of Miami-Dade County's Strategic Plan, published in 2003: "Miami-Dade's County's population density, and relatively low public transit use have led to rising congestion levels and commute times that exceed the national averages...With the exception of limited areas in Miami-Dade County, the land use pattern established by years of development supports the dependence on the automobile... With few opportunities for people to live and work in close proximity, the use of public transportation and other alternative modes is effectively discouraged...Only six percent of work trips and peak period trips are taken using transit and average automobile occupancy for work trips is just 1.09. Major roadways are currently approaching or exceeding capacity. Addressing the capacity issues will be a formidable challenge as the County's population is expected to grow by almost 40% by the year 2025..." Many of the goals and strategies specifically listed in the Transportation Component of the County's Strategic Plan directly support transportation related elements of the original Urban CO_2 Reduction Plan. The information provided below is an update of the programs that fall under the Transportation Sector, which has been reported upon in previous CO_2 emission reduction update reports.

A. MASS TRANSIT & ROAD IMPROVEMENTS

A.1: Expansion of Metromover to Brickell and Omni (MDTA)

The Metromover is an electrically powered, fully automated light-rail people mover system that connects with Metrorail at Government Center and Brickell Stations and with Metrobus at various locations throughout downtown Miami. Metromover offers convenient access to a variety of government, business, entertainment and cultural centers in the central Downtown, Omni and Brickell areas. The Omni/Brickell Extensions opened in May 1994, at a cost of $228 million. The length of the Omni leg is 1.4 miles and the Brickell leg is 1.1. Miles. It is important to note that the fares for use of Metromover were eliminated in 2002 thereby increasing utilization. Further increases in utilization are expected as the Performing Arts Center, Arena and Museum complexes reach their full potential and as major new residential projects come on line on both extensions.

Estimated CO_2 emission reductions from the Brickell/Omni extension are approximately 1,939 tons per year.

A.2: Extend Transit

(a) South Miami-Dade Corridor/South Dade Busway Extension *(MDTA)*

The South Dade Busway is a 20-mile corridor that runs along U.S. 1 from the Dadeland South Metrorail Station to Cutler Ridge, and from Cutler Ridge to Florida City. Segment I (Dadeland South Metrorail Station to Southland Mall in Cutler Ridge) is an 8.5-mile stretch that was completed in February 1997. The first part of Segment II (Southland Mall to SW 264th St.) is 6.5 miles long and was completed in May 2005. Completion of the final 5-mile phase (SW 264th St. to SW 344th St.) is expected in the last quarter of 2007. The Busway also includes a bike path along the west side of the Busway road and bike racks on the front of the buses.

Ridership numbers have increased steadily from 2003 to 2005 as shown in the table below:

Year	Rideship Numbers for Busway Extension
2003	1,198,613
2004	1,479,909
2005	1,667,659

Estimated CO_2 emission reductions are approximately 1,978 tons per year.

(b) Extend Metrorail to Palmetto Expressway *(MDTA)*

This 1.4-mile extension is the first to the County's heavy rail system since its inception in 1984. The new Palmetto Metrorail Station opened on May 30, 2004.

Estimated CO_2 emission reductions are approximately 182 tons per year.

(c) The People's Transportation Plan (PTP) *(MDTA, PWD)*
Miami-Dade County residents approved a half-penny sales tax in November 2002, funding a 25-year, $17 billion comprehensive transportation improvement program referred to as the People's Transportation Plan (PTP). This comprehensive program incorporates elements of the Long Range Transportation Plan and the "Transportation Component" of the Strategic Plan. The Citizens' Independent Transportation Trust (CITT) is a 15-member independent body created to oversee expenditure of the half-penny sales tax. The Office of the Citizens' Independent Transportation Trust (OCITT) provides staff support for the CITT and coordinates public outreach efforts to inform the community regarding the improvements that have been implemented.

A People's Transportation Plan "Pro Forma Update" is completed annually and provides an update on the financial status and progress of the Plan. The 2005 update stated the following: "As promised and scheduled, we have improved existing bus routes while adding 24 new routes and an additional 11 million annual revenue miles of bus service for a total of 105 routes; Metrorail trains now arrive more frequently; and the Metromover is free... As of September 30, 2005, ridership has increased system-wide 25.3 percent since the November 2002 PTP referendum. Metrorail ridership has increased 23.8 percent; Metrobus ridership has increased 21.1 percent; Metromover ridership has increased 83 percent." The full 2005 People's Transportation Plan Pro Forma Update [14]can be viewed on-line.

(d) Additional Transit Projects *(MDTA)*
Several other transit projects are currently in various stages of planning and development, including the following:

The North Corridor Metrorail Extension, a 9.5-mile heavy rail extension of Metrorail that will extend along NW 27 Avenue from the Dr. Martin Luther King Jr. Metrorail Station to the Broward/Miami-Dade County line.

The Northeast Corridor, a 13.6-mile from Downtown Miami to the Broward County line (NE 215 Street) along Biscayne Boulevard and the Florida East Cost Corridor right of way.

The Kendall Corridor, a 15-mile corridor from Dadeland North Metrorail station to SW 157 Avenue and a north/south segment along the Florida Turnpike, connecting with the East-West corridor.

The Miami Intermodal Center (MIC)-Earlington Heights Connector, a 2.3-mile heavy rail extension of Metrorail that will extend from the MIC (north of NW 21 Street and east to NW 42 Avenue) to Earlington Heights Metrorail station at NW 22 Avenue.

The East-West Corridor Metrorail Extension, extending the Metrorail 10.1 miles along congested SR 836, between the Miami Intermodal Center at Miami International Airport and Florida International University to the west.

Bay Link, the MPO completed a Supplemental Draft Environmental Impact Statement (SDEIS) for Bay Link with the Locally Preferred Alternative (LPA) adoption in September 2004 of a light rail/street car system connecting downtown Miami and South Miami Beach via the MacArthur Causeway operating in a loop configuration in both areas.

More information about these and other Transit projects can be found on the Miami-Dade Transit Website [15].

A.3: Construct all road improvements listed in the Long Range Transportation Plan that are consistent with the other transportation and land use measures in this Plan (MPO)

The Long Range Transportation Plan has been periodically updated during the implementation of the Urban CO_2 Reduction Program to help meet the changing needs of Miami-Dade County residents and businesses. The Governing Board of the Metropolitan Planning Organization (MPO) adopted the most recent update, "Miami-Dade Transportation Plan (to the Year 2030)" [16], on November 14, 2004. The Goals of the Plan include improving transportation systems and travel, supporting economic vitality, enhancing social benefits, mitigating environmental and energy impacts, integrating transportation with land use and development considerations, and optimizing sound investment strategies. The Plan continues to give in-depth consideration of Intermodal improvement opportunities, Intelligent Transportation System Technologies, Transportation Demand Management, and Congestion Management Techniques. The finalized plan is expected by November 2009 and will be called "Transport 2030".

A critical new project authorized by the Miami-Dade Board of County Commissioners in Resolution R-1206-06 on October 12, 2006, is the Port of Miami Tunnel. This rapid egress/ingress path to and from the Port of Miami for trucks and commercial vehicles should significantly reduce vehicle emissions caused by congestion on city streets due to Seaport traffic.

Since the last update provided in 2001, many roadway and highway projects have been completed, as well as many studies. More information can be found on the website of the Miami-Dade Metropolitan Planning Organization [17].

B. INCREASE TRAFFIC DEMAND MANAGEMENT PROGRAMS

B.1: ElectroWave Shuttle on Miami Beach (MDTA)

The "ElectroWave" electric shuttle bus system was an innovative and popular mode of public transportation that served the South Beach area of Miami Beach for 6 years, helping

increase the mobility of residents and visitors, and alleviating parking problems in the area. It was initiated in January of 1998 and was composed of eleven electric powered shuttles with seating on each shuttle for 22 passengers. The shuttle supported a park-and-ride program and linked existing transportation services provided in the area. Unfortunately, the program began experiencing difficulties when the company that produced the ElectroWave discontinued production of the shuttle bus in 2001 and then declared bankruptcy in 2002. This led to difficulties and increased costs in obtaining parts for repair and one bus was permanently taken out of service due to a fire. Eventually, the program became too expensive and difficult to maintain and was discontinued in September 2005. This timing coincided with an interlocal agreement between the City of Miami Beach and Miami-Dade County whereby Miami-Dade Transit assumed operation of Miami Beach's transit system to enhance transportation services in the area. A system of diesel minibuses replaced the ElectroWave shuttle buses and the ElectroWave shuttle route was combined with another existing Miami-Dade Transit route to expand the overall service area of the route. This became the "South Beach Local" route that is currently under operation.

From January 1998 to September 2005, operation of the **ElectroWave shuttle service reduced approximately 10,012,399 vehicle miles traveled (VMTs)**, which resulted in a total of **6,082 tons of CO_2 emissions reduced** during implementation of this program. **Estimated CO_2 emission reductions are approximately 785 tons per year.**

It is interesting to note that a similar trolley service has been successful in the City of Coral Gables and that the City of Miami is considering a light rail surface level system to serve the corridor northeast of the Central Business District (CBD).

B.2: South Florida Commuter Services Program (MPO & FDOT)

South Florida Commuter Services Program [18]is a regional program that was initiated in 2002 through a partnership between the Department of Transportation and the Miami-Dade Metropolitan Planning Organization (MPO). The program promotes alternatives to the Single Occupancy Vehicle (SOV) such as carpooling, vanpooling, and use of mass transit. It provides many free services including a 24-hour call center, tri-county transit information, computerized rideshare matching, and the Emergency Ride Home Program. The Emergency Ride Home Program is a valuable service which allows employees, who rideshare or use mass transit at least three times a week, to receive up to six free taxi rides home a year, in the event of unexpected emergencies such as sickness, unscheduled overtime, or other personal emergencies. The South Florida Commuter Services Program reduced approximately 49,602,700 vehicle miles traveled (VMT's) during the span of four years (2002-2005).

A total CO_2 emission reduced during implementation of this program (2002 – 2005) is approximately 30,128 tons. Estimated CO_2 emission reductions are approximately 7,532 tons per year.

B.3: South Florida Vanpool Program (MPO & FDOT)

The South Florida Vanpool Program[19] was initiated in 1998 and is an integral component of the South Florida Commuter Services Program. It encourages commuters to rideshare to work utilizing a passenger van that can seat 7 – 15 individuals, depending on the size of the ridesharing group. One member of the group agrees to be the primary driver and enters into a monthly agreement with a vanpool management company. The rental of the van is subsidized and all insurance costs and maintenance costs are covered. There are many benefits to commuters who participate in this program, such as reduced wear and tear on personal vehicles, reduced commuting and parking costs, reduced commute time through use of High Occupancy Vehicle (HOV) lanes, and use of the Emergency Ride Home Program described above. A 2006 update report for the Program is available on the Vanpool website (link above) that provides many additional details about the implementation and success of the Program. The South Florida Vanpool Program reduced approximately 38,271,635 vehicle miles traveled (VMT's) from 1999 - 2005.

The South Florida Vanpool Program (1999 – 2005) has led to an annual average CO_2 emissions reduction of approximately 3,752 tons/year, for an overall reduction of approximately 22,510 tons during implementation of the program.

C. PROMOTE INCREASED USE OF BICYCLES

C.1: Adopt (& implement) policy incorporating bicycle facilities into the County's plan for a new road construction or reconstruction projects (MPO)

In 1995 the Metropolitan Planning Organization (MPO) realized the need to provide improved bicycle routes and paths for those residents desiring a non-motorized mode of transportation, and developed the first Bicycle Facility Plan. With improved routes for bicycle and pedestrian traffic, more residents have the option of choosing non-motorized modes of transportation, thereby reducing vehicle miles traveled (VMTs). This Plan was updated in 1997 and details about this update can be found in the Long Term CO_2 Reduction Plan for Miami-Dade County 2001 Progress Report[20].

The current plan, titled the "2025 Bicycle Plan", updates the 1997 Bicycle Plan and serves several purposes: 1) Identify bicycle facility needs based on quantitative analysis; 2) Identify candidate project to address the bicycle facility needs; 3) Prioritize bicycle facility projects; and 4) Develop a Minimum Revenue Plan based on projected funding. The current version of the 2025 Bicycle Plan [21]can be viewed and downloaded from the MPO website. More information may also be obtained by contacting the MPO's Bicycle/Pedestrian Coordinator's Office or visiting the website at:
http://www.miamidade.gov/mpo/mpo8b-plan-bpp.htm

C.2: Adopt a shower facility ordinance for office buildings and require that all nonresidential and non-retail developments provide bicycle racks at a minimum rate

of five parking spaces for every 100 automobile parking spaces as stated in the Draft Bicycle Facility Plan. (MPO)

(a) Adopt a Shower Facility Ordinance (MPO)
See information in C.2 (b) below.

(b) Provide bicycle racks as stated in the Draft Bicycle Facility Plan (MPO)

On July 13, 1999, the Miami-Dade County Commission passed Ordinance No. 99-81[22] requiring bike racks or other means of bicycle storage for all park, shopping center, office, and restaurant uses with parking lots located within the unincorporated part of Miami-Dade County. This is enforced by the Department of Planning and Zoning for new construction and by Team Metro for existing facilities.

The standards are detailed in the chart below.

Total Parking Spaces in Lot	Required # of Bicycle Parking Spaces
25 to 50	4
51 to 100	8
101 to 500	12
501 to 1000	16
Over 1000	4 additional spaces for each 500 spaces over 1000

Although, no legislation has yet been passed requiring shower facilities for professional office buildings, a fitness center facility has recently been completed in the Stephen P. Clark/Government Center building that will provide showers for Miami-Dade County employees. In addition, bicycle lockers have also been added at the downtown Government Center for secure bicycle storage. The fitness center showers and bike lockers will serve as a demonstration project to show if providing these facilities will help induce employees to bicycle to work.

C.3: Expand Bikes-on-Trains Program to include counter-flow and first hour service (MPO & MDTA)

Miami-Dade Transit made several permanent changes to the Bike & Ride [23] program following a trial period in 2003. Bike & Ride customers may now bring bikes on the Metrorail at any time and on to any car, use rack-equipped Metrobuses without a permit, and bring bicycles on the Metromover. 166 new bike racks were installed in September 2006 at Metrorail stations between Dadeland South and Earlington Heights. It is anticipated that these improvements will attract additional patrons to transit and give options to riders that may not need to bring their bikes along with them to their final destination.

Between the years 2002 and2005, over 8,200 Bike-on-Train permits were issued, resulting in an average of 508 tons of CO_2 emissions reduced annually.

C.4: Implement Bikes on TriRail (MPO & MDTA)

The TriRail system is a heavy rail system that transports commuters between Miami-Dade, Broward, and Palm Beach Counties, connecting directly with Miami-Dade's Metrorail system. TriRail began issuing permits to bring bicycles on the trains in August 1996. These one-time permits do not require renewal or annual fees and therefore make it difficult to determine the number of active users at any one time. However, periodic counts in 2006 indicated that approximately 260 riders were bringing their bicycles onto the train on a daily basis, primarily during peak morning and afternoon hours. Since the program was initiated, TriRail has issued a total of 9,776 bicycle permits. **Estimated CO_2 emission reductions are approximately 77 tons per year.**

C.5: Investigate utility easements, transit, and railroad rights-of-way to use for bicycle/pedestrian facilities (MPO)

This initiative has been on going during implementation of the Urban CO_2 Reduction Plan. As areas are evaluated, suitable easements and rights-of-way are identified and incorporated into a current Bicycle Plan. The current 2025 Bicycle Plan can be viewed on-line, as mentioned above in item C.1. Since this is an indirect measure benefiting CO_2 emissions reductions, no quantifiable data is available for CO_2 emissions reductions calculations.

D. INCREASE FUEL EFFICIENCY

D.1: Utilize more fuel-efficient cars in the Miami-Dade fleet (GSA)
Miami-Dade County is currently implementing several measures in an effort to improve the overall fuel efficiency of its passenger vehicle fleet. These initiatives were given a significant boost when Resolution #969-03 was passed in September 2003, requiring the County to increase the fuel efficiency of its fleet and reduce the consumption of gasoline by 3% – 5% annually, for a total reduction of 20% in five years.

The plan resulting from this initiative identifies the three primary ways to reduce fuel consumption; namely, reduce miles driven, reduce hours of engine idling, and increase the miles per gallon efficiency of the County fleet. Towards these three goals, certain fuel efficiency initiatives and action items were implemented that would move the County toward the goal of reducing fuel consumption. Brief summaries of these are described below.

1. Fuel efficiency measures were included in the bid specifications for 2004 and 2005 model year vehicles, which include the expected cost of fuel to be used in the vehicle's useful life in the award calculations of the total cost of ownership. That information is used to determine the winning bidders. This initiative is directed at improving the overall miles per gallon efficiency of the mix of

County vehicles being operated and will provide progressively greater impact with each model year that vehicles are replaced.

2. A moratorium was placed on the purchase of SUV vehicles as these vehicles form the least fuel and capital cost friendly component of a fleet. To verify all departmental operating requirements are satisfied, GSA Fleet Management has been working closely with departments to assist them in identifying other less costly and more fuel-efficient vehicle types that are suitable for their work applications. This program is also beginning to impact the mix of County vehicles being operated, along with their average fuel consumption. Large size SUV models that are being retired from service are being replaced with less costly and more fuel-efficient vehicle types.

3. Fleet Management will continue to test and evaluate vehicles that offer opportunities to be more fuel-efficient. The County now has a total hybrid fleet of 299 units composing 3.6% of the total light fleet of 8,340 units. The County presently operates the largest municipal hybrid fleet in the State of Florida and has one of the largest hybrid fleets in the United States. GSA Fleet Management will stay on course with the continued purchase and use of electric hybrid vehicles.

(a) Utilize Compressed Natural Gas vehicles at Miami International Airport *(MDAD)*

GSA partnered with the Miami-Dade Aviation Department to establish a compressed natural gas (CNG) fueling site at Miami International Airport (MIA). The fueling site opened in June 1997 and provided service to all Miami-Dade County, State of Florida, and Federal vehicles requiring CNG. Use of the fueling site had greatly decreased by 2001 and as a result, this facility was taken out of service a few years later.

(b) Utilize Electric Hybrid vehicles in Miami-Dade Fleet *(GSA)*

Miami-Dade County GSA Fleet Management began utilizing Hybrid Electric Vehicles (HEVs) in 2002 with the purchase of five 2002 Toyota Prius HEVs, and presently operates the largest municipal hybrid fleet in the State of Florida. Additional HEV purchases have included model years 2003, 2004, and 2005 Toyota Prius HEVs, as well as 2005 Chevrolet Silverado hybrid pickup trucks, for a total hybrid fleet of 299 units composing 3.6% of the total light fleet of 8,340 units. The County had plans to purchase an additional one hundred thirty-two (132) 2006 Honda Civic HEV, but that is currently on-hold because the Honda dealer was unable to provide those vehicles for 2006. Despite this temporary delay, Miami-Dade County has already experienced the benefits from utilizing hybrid electric vehicles and intends to continue to increase the number of HEVs in its fleet. **Estimated CO_2 emission reductions are approximately 104 tons per year.**

(c) Determine the viability of using County cars for electric vehicle prototype in conjunction with DOE, the Electric Power Research Institute, and the local power company *(GSA, DERM)*

The use of County vehicles for an electric vehicle prototype study was researched and rejected because of short mileage range of a charged battery and the length of the recharging process.

D.2: Develop a public education and awareness campaign to limit idling of automobiles/trucks

Anti-Idling Educational Tools (DERM)

Miami-Dade County was awarded a Transportation and Air Quality grant from the U.S. Environmental Protection Agency in 1997 for a project entitled I.D.L.E. (Instructing Drivers to Lower Emissions) in Dade. The goals of the project were to educate Miami-Dade County's high school students, the next generation of drivers, on the impact driving has on air quality; alternative fuels and transportation; proper automobile maintenance and driving (i.e. not idling, decreasing engine load, etc.); and to increase awareness of various air pollutants from vehicular emissions and their effects. A twenty-minute video entitled "Revved Up" and featuring local high school students was produced as an educational tool. A Train the Trainer Workshop presented to 100 Driver Education Teachers included a copy of the "Revved Up" video, curriculum and an overhead presentation, fact sheets, car care quizzes, Car Care Log Books, and Mini Key Chain tire pressure gauges. In addition, DERM staff provided IDLE presentations to over 3,200 driver education students. The educational tools produced from this grant were requested by several state and local air quality agencies for implementation in school districts around the country.

Anti-Idling School Bus Policy (M-DCPS)

In 1993, the Miami-Dade County School Board instituted an Energy Conservation Policy in its Handbook for School Bus Drivers. Among other fuel efficiency practices, the policy reminds the drivers that the bus achieves zero miles-per-gallon when it is stopped with the engine idling, and directs them to turn off the engine when the bus is stopped for more than a few minutes.

D.3: Develop a team of local public/private representatives to identify and promote the most practical and cost effective alternative fueled vehicles.

Alternative Fuels Advisory Committee (GSA, MDTA, MDAD, DERM, and MPO)

The County Manager appointed members to the Alternative Fuels Advisory Committee in January 2002, pursuant to Board of County Commissioners (BCC) Resolution No. R-378-01. The Committee's mission, as stated in the Manager's appointment memo, was "to develop and implement a program to enhance the utilization of alternative fuels in Miami-Dade County." The Committee was comprised of staff representatives of the departments operating significant fleets (GSA, Transit, Aviation) and those having environmental and transportation planning responsibilities (DERM, MPO). After reviewing the available information regarding performance, environmental impacts, and costs of alternative fuels

and transportation technologies, the Committee recommended a series of pilot projects to include testing of hybrid (gasoline/electric) cars and hybrid (diesel/electric) buses, electric tugs at the airport, use of biodiesel fuel at the airport, and monitoring of other transit agencies' experience using a biodiesel fuel blend in their bus fleets. The recommendation to implement pilot projects for testing hybrid cars and buses were both implemented. The Committee summarized their findings and recommendations in the "Alternative Fuels Advisory Committee Report and Recommendations" which can be found on the Miami-Dade Urban CO2 Reduction Plan webpage[24]. Details about these pilot projects can be found in Section D.1.b. of the Transportation Sector (*Utilize Electric Hybrid vehicles in Miami-Dade Fleet (GSA))* and paragraph a) Transportation Sector (Chapter 2 - Program Results, Summary of Annual Average CO_2 Emissions Reductions by Sector), respectively. Furthermore, MDAD and MDTA continue to evaluate the cost and operational issues in their consideration of biodiesel fuel in their operations.

D.4: Promote an increase in national gas mileage standards to 45 mpg

At the Federal level the most important standards relating to emissions reductions of greenhouse gases are the Corporate Average Fuel Economy (CAFE) standards [25] administered by the National Highway Traffic Safety Administration (NHTSA). When the original Urban CO_2 Reduction Plan was being developed, a 1991 national poll indicated that "...65% of Americans favored higher fuel efficiency standards."[26] and it was anticipated that the national CAFE standards would be increased significantly, to 45 miles per gallon (mpg) from the 27.5 mpg standard at that time. This measure was seen as "...the single largest opportunity to reduce emissions" which resulted in an anticipation that this measure alone would lead to over 8,000,000 tons of CO_2 emissions reductions annually. This comprised approximately 70% of the total 11,346,610 tons of CO_2 emissions reductions projected annually for Miami-Dade County's Urban CO_2 Reduction Plan.

On April 19, 1994, Miami-Dade County passed Resolution # R-554-94, urging Congress and the President to sign legislation increasing the CAFE standards to 45 miles per gallon to significantly reduce carbon dioxide emissions. The CAFE standards have remained relatively unchanged until early 2003 when the NHTSA issued new light truck standards, setting a standard of 21.0 mpg for Model Year (MY) 2005, 21.6 mpg for MY 2006, and 22.2 mpg for MY 2007. Recently, a more significant change came in March 2006, when the NHTSA issued a final rule reforming the structure of the CAFE program for light trucks and establishing higher CAFE standards for MY 2008 – 2011 light trucks. With this reform, during a transition period for MY 2008 – 2010, manufacturers have the option of complying with CAFE standards established in the traditional way (Unreformed CAFE) or with standards established under the reformed structure (Reformed CAFE). The current "Unreformed CAFE" standards are as follows: MY 2008 = 22.5 mpg, MY 2009 = 23.1 mpg, and MY 2010 = 23.5 mpg. Under the "Reformed" program, CAFE standards will be calculated using several factors, including the vehicle's size, production volume, and sales. It is anticipated that Reformed CAFE standards for MY 2011 [27] light trucks will be approximately 24 mpg. A similar type of reformed system for passenger vehicle CAFE standards is currently under consideration at the federal level, which has the potential to lead to even more significant greenhouse gas emissions reductions.

E. REDUCE VEHICLE MILES TRAVELED (VMTs) THROUGH TECHNOLOGY IMPROVEMENTS

The initiatives described in this category are new measures that have been implemented as a result of computer and Internet technology improvements not available when the Plan was originally developed. It is anticipated that there will be additional new measures in this category that will further contribute to Greenhouse Gas emissions reductions in the future.

E.1: Clerk of Courts Voice Response System (COC)

A Voice Response System was established in 1995 under the direction of Harvey Ruvin, Clerk of the Courts. The system provides information to Miami-Dade County citizens in regards to the court system, without having to leave their homes or offices. Citizens can pay traffic and parking tickets, make court dates (civil and criminal), or make inquiries on child support payments.

The total reductions in annual CO_2 emissions were estimated between the years 1996 – 2005 as a result of Vehicle Miles Travel (VMT) reduced through this initiative is 5,777 tons of CO_2. **Estimated CO_2 emission reductions are approximately 578 tons per year.**

Year	Average Monthly Calls	Yearly VMT
1996	3,600	432,000
1997	4,600	552,000
1998	4,000	480,000
1999	7,400	888,000
2000	12,332	1,479,780
2001	10,813	1,297,560
2002	10,692	1,283,040
2003	12,342	1,481,040
2004	6,894	823,730
2005	6,612	793,490

E.2: Simultaneous Paperless Image Retrieval Information Technology (SPIRIT) Program (COC)

In 1998 the Clerk of Courts started using the SPIRIT (Simultaneous Paperless Image Retrieval Information Technology) imaging technology. SPIRIT is a collection of several programs, databases and computers that help the entire traffic court system of Miami-Dade County convert paper-based documents into an electronic digitized format.

The SPIRIT Program has resulted in more efficient caseload management overall, as well as other associated benefits such as: 1) The maximization of the utilization of calendar and existing courtroom space, 2) Efficient and timely setting of more than 15,000 cases per week within the "Speedy" trial rules, 3) A significant reduction in police officer overtime due to the reduction in necessary court appearances, and 4) Increased officers' hours on the street through improved scheduling and other efficiencies. Additionally, other non-quantifiable benefits include: improved quality of life, expanded access to court facilities, and more efficient public service counter activities.

In March of 2003 the ability to pay traffic fines on the Internet was implemented and has resulted in a reduction in the number of visits to the Clerk's offices throughout the county. While the program was initiated in 2003, the ability to monitor web site activity was only recently implemented in 2005. Steps to further reduce vehicle miles traveled include the implementation of a system to allow individuals to obtain court clearances and to reinstate their driver licenses (April 2006) and the ability to request Certified Copies of Recorded Documents (May 2006) over the Internet. It is expected that more citizens will take advantage of these web-based services as public awareness of the programs increase. During 2005 a total of 28,526 traffic fine payments were made through the SPIRIT traffic website. **Estimated CO_2 emission reductions are approximately 173 tons per year.**

Despite the fact that development in Miami-Dade County is restricted to the west by the Everglades, and restricted to the east by the Biscayne Bay/Atlantic Ocean, early development patterns set the stage for sprawl, putting people farther away from employment opportunities and municipal services, and leading to more cars on the roads for longer periods of time. An important component of the original Urban CO_2 Reduction Plan was to encourage smart growth patterns, promoting infill, mixed-use, and Transit and Pedestrian Oriented Development (TOD), to help reduce the number of cars on the roads, as well as vehicle miles traveled (VMTs). This section provides an update on implementation of "land-use" measures to support the Plan.

A. REDUCE VEHICLE MILES TRAVELLED BY 5% THROUGH MIXED LAND USE

A.1: Review and amend regulations to encourage implementation of transit and pedestrian-oriented development (TOD) principles in new development (DP&Z)

Since adoption of amendments to the Comprehensive Development Master Plan (CDMP) in 1996, a considerable effort has been devoted to the review and amendment of existing land development regulations in order to further the principals of transit and pedestrian oriented (TOD) development. The following are some of the activities initiated to revise regulations:

Traditional Neighborhood Developments (TND)(DP&Z)
The TND ordinance, adopted in 1991, requires design principles emphasizing mixed-use development, green space and pedestrian-friendly neighborhoods. Amendments to the ordinance have been passed to include accessibility provisions for people with disabilities, to allow for the option of a green space as an alternative to the mandatory town square, to allow residential dwellings as permitted in the Workplace Land Use category, and a modification to allow two workplace areas in a TND of 100 acres or more, where previously only one was allowed.

Three TND applications featuring town squares, front porches, old-fashioned storefronts, townhouses, single-family homes, open areas and commercial space have been approved since the last reporting period (January 2001):

- Mandarin Lakes TND – a 201-acre, 1,562-dwelling unit development located south in Miami-Dade County
- Kendall Commons TND - a 160-acre, 1,256-dwelling unit development located in the Kendall area (west Miami-Dade County)
- Landmark 107 TND - a 120-acre, 1,050-dwelling unit development located in the newly incorporated City of Doral.

Revision of the County's Zoning Code (DP&Z)
The Zoning Code Re-Write Project,[28] started in February 2000, aims to simplify, rationalize, and modernize the County's Zoning Code. "New Urbanism" concepts are

being incorporated into many of the zoning district revisions, which will have the effect of deterring sprawl, encouraging a compact development pattern, reducing trip length, and facilitating multi-purpose trips. Many of these proposals would allow greater density (dwelling units per acre), higher intensity (floor area ratio), increased height and a mix of different uses as incentives to improve currently developed sites. The Zoning Code rewrite process, being a complicated one, has taken more time than originally expected and is anticipated to be presented to the Board of County Commissioners in the near future.

Comprehensive Development Master Plan Amendments[29] *(DP&Z)*
The Board of County Commissioners amended the Comprehensive Development Master Plan (CDMP) on April 27, 1999 to conclude the "1995 Evaluation and Appraisal Report (EAR)" based major update of the CDMP. The update required transit-supportive development intensities in planned transit-served areas to complement the guidelines for development of Urban Centers that already existed in the CDMP. The compliance amendments to both the Land Use and Transportation Elements promote transit and pedestrian oriented development and the coordination of land use and transportation planning.

In October 2003 the BCC adopted the Evaluation and Appraisal Report (EAR), which is required every 7 years to evaluate the effectiveness of the CDMP. This report evaluated County issues and reviewed all CDMP goals, objectives and policies to determine their effectiveness. Modifications were proposed as necessary.

The October 2004 Applications to Amend the CDMP, effective March 2006, included the following new policies and revisions which are expected to result in a reduction of greenhouse gas emissions:

- LU-1S - A new policy that links and requires consistency between the CDMP and the Strategic Plan.
- Adoption of new population projections, which are critical to the planning/analyses of land needs and urban services, both for the entire County and for sub-areas. These projections and strengthened CDMP policies encourage higher densities in rapid transit corridors and to discourage amendments to the Urban Development Boundary.
- LU-7(G, H, I) -New policies were added to the Land Use Element to encourage a mix of uses in transit corridors and urban centers. These are also noted in the above section of TOD.
- LU-9(N through U) - New policies related to increased densities and "Smart Growth" allowing for a mixture of uses that will provide more walkable communities and increase the use of transit.
- LU-10 (C, D, and E) and HO-7C – New policies that relate to the promotion of green buildings in the County.
- LU-11 and LU-12 – New Goals and Policies related to redevelopment and infill development in desirable areas through the identification of potential sites and provision of incentives.

- New CDMP Land Use Element text relating to increased densities in categories along transit corridors and in Community Urban Centers (CUCs).
- Creation of live-work, work-live, and mixed use text in Business and Office and Industrial and Office categories.
- HO-3G, 6A, 6C – New policies on housing linkage programs and location of affordable housing near employment centers and mass transit.
- Modifications to the Conservation Element (Objective 1) to strengthen the air monitoring programs, and reduce the ozone depleting compounds.
- CON-8M – New Policy, which seeks to increase the percent of tree canopy in the County from 10% to 30%.

A.2: Encourage infill development by requiring utilization of TOD development principles within activity centers and along major transit corridors

(a) Community Urban Centers *(DP&Z)*

The Comprehensive Development Master Plan promotes an urban form comprised of three scales of "Urban Centers" (Regional, Metropolitan, and Community) linked by effectively and rationally planned roadway and transit systems. The CDMP designates Community Urban Centers (CUCs) for mixed-use, transit-oriented developments. Small Area Studies are carried out by the Department of Planning & Zoning's Urban Design Center and include specific area plans and ordinances for community urban centers in the unincorporated area of Miami-Dade County. The initial process of these studies takes the form of a Charrette, which blends public participation with practical planning techniques. These studies brainstorm complex planning problems to achieve a vision for effective future growth within the various study areas. A complete list of projects ("study areas")[30] can be found on the DP&Z website[31].

Downtown Kendall Urban Center District (DKUCD) [32]*(DP&Z)*

The Downtown Kendall Urban Center District is exemplary of efforts to produce a Metropolitan urban center that fulfills the goals, objectives and policies of the County's Comprehensive Development Master Plan by:

- Coordinating the development intensity within the district by the proximity to mass transit; e.g.: Dadeland North and South Metrorail station
- Organizing an interconnected network of colonnaded or tree lined streets to improve pedestrian access to transit; and
- Creating public open space with specific square and plaza locations and by shaping the way buildings front onto the open space and streets.

Since its adoption on December 16, 1999 by the Board of County Commissioners, Ordinance No. 99-166 (DKUCD) has been amended six times, three times in 2001 and three times in 2002. Under current design, the total number of residential units for DKUCD is approximately 4,700 units (excluding Marriott Hotel).

(b) 2003 Evaluation and Appraisal Report (EAR) *(DP&Z)*
Actions taken by the Department of Planning & Zoning Department relevant to this measure include:

i) Vacant or underutilized sites, which might be suitable for infill housing, are being identified by the use of the Geographic Information System (GIS) Land Use File. An infrastructure assessment is also being carried out and the County is identifying for adoption a package of financial and regulatory incentives for new development on vacant properties in the Urban Infill Area (UIA).
ii) Miami-Dade County shall evaluate the current UIA as designated in the CDMP and if needed, redefine the UIA and develop policies specifying that this area shall receive priority for future public and private investments in infrastructure, services, development and compatible redevelopment.

(c) The Residential Density Feasibility Study (EAR/CDMP) *(DP&Z)*
The Residential Feasibility Study was prepared pursuant to Resolution R-1063-00, which directed the DP&Z to: "Study the feasibility of establishing high density development zones throughout the County, including consideration of incentives, where appropriate, which will make the cost of development within these high density development areas comparable to the cost of developing the outlying areas of the UDB."

The study reviewed the central factors affecting the ability of property throughout the County to be developed at a range of densities. These factors were evaluated, findings and conclusions were drawn, and recommendations were issued which suggest how the County could facilitate an increase of densities at appropriate locations throughout the County. The adopted 2003 EAR, addressing the CDMP, stated that the department should move forward with the following feasibility study recommendations:

i. Provide TOD planning for all Metrorail and South Dade Busway stations
ii. Increase flexibility in low density residential land use category
iii. Secure resources for area planning initiatives
iv. Incorporate Smart Growth initiatives identified in the Residential Density Feasibility Study

(d) Promotion and Implementation of Eastward Ho! & Brownfields Program *(DERM, OCED)*
The Eastward Ho! Brownfields partnership is a diverse coalition that was created in 1997 and is coordinated by the South Florida Regional Planning Council (SFRPC). It is comprised of organizations at the local, state and federal level, working together with private sector, non-profit, and community organizations to revitalize southeast Florida's historic urban core, thereby helping to alleviate growth pressures on one of the nation's most imperiled wetlands ecosystem, the Everglades, as well as the Biscayne National Park. The Partnership was designated one of the first 16 National Brownfields Showcase Community Projects on March 17, 1998 and was the first National Brownfields Showcase Community to cover a large, regional metropolitan area. In 2000, Miami-Dade County received delegation from the Florida Department of Environmental Management to

administer the brownfield program as permitted by the Florida Brownfields Redevelopment Act, 376.77-.85, Florida Statute. As a continuing effort to redevelop vacant, under-utilized properties (brownfields), Miami-Dade County has expanded in total the number of brownfield areas and Brownfield Site Rehabilitation Agreements (BSRAs), which provide access to funding resources and other incentives. There are currently 12 designated brownfield areas in unincorporated Miami-Dade County, as well as several other projects in various stages of designation or development that are located in municipalities such as City of Miami, City of Miami Beach, City of Hialeah, City of Homestead, City of North Miami Beach, and City of Opa Locka.

A.3: Continue to promote the evolution of sub-centered urban form, comprised of major, intermediate, and local activity centers; activity corridors; enterprise/employment centers and transit network. In appropriate locations in intervening areas, promote applicable TOD principles and the balanced provision of convenience retail, personal services, and various types of residences.

(a) Metrorail Station Area Planning *(DP&Z)*

The DP&Z is assisting Miami-Dade Transit Agency (MDTA) and local Municipalities to promote sound TOD principles in numerous joint development requests for the Metrorail station sites by reviewing development proposals for the Metrorail areas, and reviewing development guidelines to promote transit supportive land use and design in the station areas. This strategy is accomplished through the inclusion of CDMP TOD guidelines in the published requests for proposals (RFPs) and through participation on the County's Development Impact Committee to ensure that proposed site plans conform with the CDMP TOD guidelines.

Additionally, four Metrorail stations along NW 27th Avenue in the North Corridor have been designated for urban center development. The Department of Planning & Zoning's Community Planning Section is working closely with Miami-Dade Transit in conducting Community Design workshops and developing charrette TOD plans for the proposed stations. The four Metrorail stations are a part of the North Corridor Metrorail Extension[33], an elevated 9.5-mile double-track, and heavy-rail extension of the Miami-Dade Metrorail system.

Efforts are also being made to locate county-owned buildings at or near Metrorail stations. Two county departments have recently been relocated in buildings adjacent to Metrorail stations, the Department of Solid Waste at the Dr. Martin Luther King Jr. Plaza and the Water & Sewer Department at the Douglas Road Station. In addition, the Department of Environmental Resources Management along with the Transit Department and Community Action Agency will relocate to a building at the Overtown/Arena Station when construction of the building is completed in 2007.

Another major planning effort that supports Miami-Dade County's TOD efforts is the South Dade Watershed Study and Plan. It is currently nearing completion and includes both a design guide and recommended strategies to encourage the intensification of development

along transit corridors. The Plan encompasses a 370 square-mile area located in the southeastern portion of the County, including that portion of U.S. 1 located south of Tamiami Trail. The design guide includes zones recommended for higher densities along both sides of the U.S. 1 corridor, with a major focus on unincorporated areas of the County where Charrette Area Plans have been adopted. Charrette design workshops were held in several communities located along the U.S. 1 corridor such as Perrine, Naranja and Cutler Ridge, and zoning districts subsequently adopted that promote higher density development in portions of these communities located along the transit line. Intensification of development in existing areas located along the U.S. 1 corridor will result in a reduction of vehicle miles traveled and help promote the Watershed Plan goals of preserving open space and farmland located outside of the Urban Development Boundary.

A.4: Encourage provision of civic buildings within urban neighborhoods through site planning and capital improvements programming

(a) School Facility Planning *(Miami-Dade County Public Schools)*
In February 2003, the County, the municipalities in Miami-Dade County, and the Miami-Dade County School Board entered into an interlocal agreement for the coordination of land use and public school facility planning addressing the following:

(1) Better coordination of new schools with land development
(2) Greater efficiency by placing schools in locations of existing and/or planned infrastructure, parks, ball fields, libraries and other community facilities, etc.
(3) Improving student access and safety by coordinating construction with roads and sidewalks
(4) Locating and designing schools to serve as community focal points

b) Team Metro Office Locations[34] *(Team Metro)*
Team Metro, one-stop centers dedicated to improve access to Miami-Dade County services, offers its services through its eight regional offices and a mobile office called the Government on the Go Bus[35]. Each Team Metro Office is responsible for a designated service area, or region and has been strategically placed for convenience and ease of access by citizens.

ELECTRICAL PRODUCTION/USE

The Electrical Production/Use sector has great potential to reduce CO_2 emissions, particularly if measures effectively impact the residential sector of the community. This is apparent in the recent success of Florida Power & Light's (FPL) Demand Side Management Program. Although many of the measures originally proposed were not successfully implemented for various reasons, several new opportunities have been identified that will likely lead to considerable emissions reductions in the future, such as converting traffic lights to LED technology. In addition, the Miami-Dade County Manager's Office directed all County departments in 2005 to take specific actions to conserve energy and fuel resources. This has led to various energy-conserving initiatives such as increased carpooling, videoconferencing, and tighter controls of building operations, all of which will lead to reduced emissions.

A. INCREASE EFFICIENCIES OF MIAMI-DADE FACILITIES/OPERATIONS

A.1: Initiate "Green Lights" Programs and integrate with other County building retrofits for a 20% increase in efficiency (GSA)

(a) Implement Energy Performance Contracts to increase energy efficiency of Miami-Dade County buildings (includes lighting, HVAC, chillers, etc.)

Miami-Dade County's General Services Administration (GSA) began implementing a performance-contracting program in 2000 to retrofit existing equipment such as lighting, chillers, and heating, ventilation and cooling (HVAC) systems, with more energy efficient equipment. Through this RFQ-25 Program, three companies are under contract with Miami-Dade County to provide energy performance services for all County buildings. The companies identify energy and water saving opportunities through audits, report on them to the County, and if acceptable, perform any necessary design and construction services. In order for the conservation measures to be acceptable, all expenses associated with this program must pay for themselves through utility savings and/or maintenance expenditure avoidance within a maximum of twenty years of the implementation of the measures. The program also offers the advantage of reducing equipment maintenance expenses and an opportunity to avoid capital expenditures.

From 2000 through 2005, a total of ten work orders were issued under this program for various GSA operated buildings, office buildings, fire stations, police stations, courts, libraries, correctional facilities, airport facilities, and wastewater treatment facilities. The work orders included a range of operations such as lighting, air conditioning, building control improvements, and high efficiency electric motors and drives. In addition 2,752,500 gallons of water per year are being saved through the implementation of the energy performance work orders issued during the same period. The program will continue to expand to address additional departments and facilities and revisit previously retrofitted buildings in hopes of identifying additional savings opportunities. **Estimated CO_2 emission reductions from these energy efficiency improvements are approximately 5,887 tons per year.**

A.2: Purchase the combined cycled cogeneration plant and wheel current excess capacity of 82,000,000-kwh/yr. to County-owned facilities and promote the use of cogeneration for other appropriate commercial applications.

Because current State law does not permit wheeling of excess electricity to commercial users, or even to other facilities owned by the same entity; there was no progress in this measure during implementation of the Urban CO_2 Reduction Plan. The County currently owns and operates electric chillers in the plant to produce and distribute chilled water to the downtown buildings. Miami-Dade County has also recently purchased a newer, more efficient chiller plant that will eventually be able to service the entire downtown chilled water loop, while reducing the current KWH consumption and corresponding CO2 emissions by an estimated 30%. Since there were no apparent legislative changes forthcoming to allow wheeling of excess energy, the cogeneration equipment was completely removed in February 2004. As a result, this measure has been dropped from the Urban CO2 Reduction Plan.

A.3: Switch to Alternative lighting technologies

(a) Solar Lighting Installed at 2 Miami-Dade Parks *(MDPR)*

Miami-Dade Parks & Recreation Department (MDPR) installed solar lighting at Briar Bay Park in an attempt to test an economical, renewable energy system that will aid in conserving financial resources as well as our natural resources. In addition to the existing lights, Florida's Department of Community Affairs agreed to give the Department 40 photovoltaic light fixtures that were originally to be installed at the Habitat for Humanity Jordan Commons Project. These lights were installed at Lago Mar Park, located in West Kendall. An additional 10 fixtures were purchased by Parks & Recreation to complete the walkway project at the park. CO2 emissions reductions could not be calculated for this measure due to a lack of information at the time this report was published.

(b) Miami-Dade County bus shelters switched to Solar *(MDTA)*

In early 2004, Miami Dade Transit Authority (MDTA) began retrofitting bus shelters with solar panels. Each shelter has one advertising panel that is lit by four 32-watt fluorescent bulbs. The advertising panels on the retrofitted shelters are programmed to be lit 6 hours per night, rather than all night, which helps insure that the shelters will still be lit, even if the solar panels are subjected to five consecutive cloudy days. Although most shelters were retrofitted by the end of 2005, some additional installations occurred in 2006. Currently, all MDTA bus stops have been changed to solar, as well as those in City of Miami Gardens and City of Miami Beach, for total of 1,044. As of 2005, the **estimated CO_2 emission reductions are approximately 1,794 tons per year.** Studies are currently underway to determine the feasibility of using compact fluorescent bulbs in the shelters, which would significantly decrease the energy required to light the shelters.

(c) Convert Traffic signals to LED technology lighting (PWD)

Miami-Dade County began converting standard traffic lights in 2002 to Light Emitting Diode (LED) technology by retrofitting 25 light signals. The full LED conversion project was postponed in 2004, but a Request for Proposal (RFP) was issued on June 10, 2006, with a plan to approve the award of two consultants to manage the actual retrofitting work; one for the North half of the County and one for the South half of the County. In the meantime, the Florida Department of Transportation (FDOT) has continued installing hundreds of LED lights in the red and green signals through their own installation efforts. Some of the yellow signals have also been converted. The conversions performed by FDOT have not been accurately documented, therefore an exact number was not known at the time this report was published. As a result, a conservative number of 300 light signals were converted as of 2003, resulting in an estimated **CO_2 emission reduction of approximately 148 tons per year**, for a total emissions reduction of 592 tons.

The complete conversion is expected by 2008 and is projected to include a total of 76,000 light signals.

A.4: Implement EnergyStar Power Management Tool in Miami-Dade County departments (DERM, WASD)

THE ENERGY STAR® Monitor Power Management Tool was installed on the DERM Network in November 2004 and enabled on all monitors in the Water and Sewer Department in November 2005. When power management is enabled computer monitors enter into a low-power "sleep" mode after a period of inactivity. When a user touches the keyboard or mouse, the monitor is quickly "awakened," returning the monitor to full power and normal function. Launching of the sleep mode reduces energy consumption from about 70 Watts down to as little as 4 Watts. Following implementation, the following annual savings and subsequent CO_2 emissions reductions are expected:

Department	Energy Savings (kWh)	Cost Savings	Annual CO_2 Reductions (tons)
DERM	305,236	$26,861	218
WASD	609,598	$45,720	376

Note: DERM savings = 218 tons of CO_2 per year
WASD savings = 376 per year. Implemented in Nov. 2005.
Hence savings for 2005 year, WASD = (376/12)*2 ~ 63 tons

Therefore total tons of CO_2 reduced for the year 2005 is equal to 281 tons.

A.5: Miami-Dade Aviation Department

(a) Removal of Incinerators at Miami International Airport

The incinerators were operated at Miami International Airport (MIA) primarily to comply with U. S. Department of Agriculture (USDA) requirements for proper and complete destruction of international waste to prevent the spread of any pesticides, diseases, or epidemics from other countries into the United States. However, the location of the incinerators interfered with the Airport's expansion plans and a feasibility study revealed that it would be preferable to handle the waste stream via a Waste Transfer Station. Therefore, Miami-Dade Aviation Department (MDAD) took their incinerators off line in July 2001. The international waste is now placed in closed containers, compacted, and taken to a power co-generating facility.

There are several benefits associated with this change, in addition to CO_2 emissions reductions. With removal of the incinerators also comes the elimination of operating permits and related monitoring and reporting requirements. In addition, energy and operating costs for the waste transfer station are lower than for the incinerators.

Estimated CO_2 emission reductions are approximately 19,976 tons per year.

(b) Development of a West End Fuel Tender Facility

A Fuel Tender Facility is similar to a gas station and is where tanker trucks fill up with fuel to supply the airplanes located at the airport. Previously, there was only one such facility, located outside of the airside operations area, on the east side of Miami International Airport. This meant that the tanker trucks would have to travel long distances in order to fuel airplanes on the west side of the airport, where the cargo area is located.

The West End Fuel Tender facility was completed in May of 2004, providing many benefits:

- Reduced traffic along the perimeter road and less commingling of large tanker trucks with public traffic. This also reduces traffic accidents and spills involving the tanker trucks
- Reduced wear and tear of tenant's equipment with resulting lower maintenance and replacement costs
- Faster refueling of cargo fleet
- Reduced fuel usage and associated emissions

Future plans are to bring the existing east side fuel tender facility into the airside operations area, which will eliminate the commingling of fuel tanker trucks with public traffic and result in additional benefits as mentioned above.

Miami International Airport has been able to reduce diesel fuel use by 20,890 gallons per year with this measure, for an estimated CO_2 emission reduction of approximately 221 tons per year.

(c) Provision of power and pre-conditioned air at terminal gates using electricity

When aircraft arrive at the terminal gates and shut off their engines, they require external power and a source of air conditioning while they are offloading and stocking up for the next flight. This is traditionally accomplished at MIA by two separate mobile diesel-powered generators and an air conditioning unit. In August 2005, terminal gates on Concourse H were retrofitted with a transformer that converts regular current to the 400kz power required by the aircraft, and an air conditioning unit powered by standard current. This has eliminated the use of the two diesel engines for this purpose, along with the air emissions and equipment clutter associated with them. Miami-Dade Aviation Department plans to have these capabilities at all gates in the future, but a completion dates has not yet been determined.

Miami International Airport has been able to reduce diesel fuel use by 131,400 gallons per year with this measure, for an estimated CO_2 emission reduction of approximately 1,391 tons per year.

A.6: Miami-Dade Water and Sewer Department's Energy Efficiency Process Improvement Team (PIT)

Miami-Dade's Water and Sewer Department (WASD) created their Process Improvement Team (PIT) and their Partner's Optimizing WASD's Efficiency & Re-engineering (POWER) Committee in 1998. The following energy conservation initiatives were identified and acted upon by the PIT Team and approved by the POWER Committee:

- *Formation of an Energy Conservation Unit (3 members) to identify and implement energy efficiency initiatives.* An Energy Conservation Committee was formed in lieu of a formal Energy Conservation Unit as originally identified by the Energy Efficiency PIT Team. The committee leads initiatives aimed at saving energy.

- *Determine need for and appropriateness of lighting and controls at all WASD facilities.* As an example, twelve lights on the top floor of the Douglas Garage were turned off.

- *Monitor plant setting to optimize energy efficiency for generating oxygen at wastewater treatment plants.* This project was piloted at the South District Wastewater Treatment Plant. The goal of this project is to utilize only the amount of oxygen necessary for treatment through the control of the amount of oxygen fed to the tanks and through sealing the tanks to maintain a constant feed based on treatment demand and consistent dissolved oxygen content. This is expected to achieve a large savings in the operation of the plant and to lead to a reduction in the discharge of high solids content effluent.

- *Increased cogeneration of electric power using digester gas and increased heat recovery at Central District Wastewater Treatment Plant and South District Wastewater Treatment Plant.* At this time a study for the upgrade in the methane gas system in order to optimize gas production for generating electricity in on-site cogeneration engines is underway.

- *Order solar powered equipment to conserve energy.* Solar powered equipment (Arrow boards) is being purchased for maintenance of traffic purposes.

- *Reduce energy consumption by studying WASD operational equipment.* Pump Stations (PS) 418, 346, and 348 were selected for retrofit following a cost-effectiveness evaluation. The pumps will be upgraded with high-efficiency motors and variable drives.

- *Feasibility study of eliminating or reducing spinning reserves at Alexander Orr Water Treatment Plant by installation of elevated storage.* A series of elevated water storage tanks were included in the last Miami-Dade Water and Sewer Department Water Facilities Master Plan.

- *At North District Wastewater Treatment Plant, connect wet wells in the two effluent pump stations and set pump start elevations in the pumping units in the injection station lower than the ocean station.* Although this project was placed on hold for operational testing of deep injection wells, it has now been approved to move forward and is pending implementation.

- *Implementation of an energy and water quality management software system such as DERCERTO.* At this time the vendor is completing a study to determine potential savings. If identified savings substantiate the cost of the software this project could be completed within 18 months.

- *Increase personal awareness and attention to energy conservation.*
  - The Energy Conservation Committee Sponsor initiated a series of periodic e-mails to all WASD employees regarding energy savings measures.
  - Starting December 2005, an energy conservation tip is included in the bi-monthly WASD publications sent to all employees. Tips include: Stop idling in you car, Small changes make a big difference and Walking Tips.
  - An Energy Conservation Committee page was developed on the WASD intranet and is routinely updated to include information on the status of on-going projects, accomplishments and tips.

Other initiatives identified and pending implementation:

- *Reduce energy costs for wastewater pumping through optimized pumps scheduling.*

- *Raise temperature setting at Douglas Building and optimize air conditioning system to reduce energy consumption.*

- *Analyze Florida Power and Light (FPL) billing criteria and procedures for all accounts.*

- *Facility energy conservation workshops at water and wastewater plants.*

B. DECREASE RESIDENTIAL SECTOR ENERGY USE

B.1 Reduce annual electricity consumption in rebuilt homes through promotion of energy efficient measures

(a) Habitat for Humanity Jordan Commons Project *(DERM)*

Jordan Commons was envisioned as a model sustainable community comprised of 200 homes located on a 40-acre site with a number of centrally located community buildings and parks. Energy efficiency, water conservation, ecological landscaping, and traditional neighborhood principles were to be incorporated into the design of the homes and community, which was estimated to achieve a 40% to 60% energy savings. This project was dropped in 1998 as a result of the Board of Directors of the Miami Habitat for Humanity decision not to pursue some of the proposed energy efficient features. The Florida Department of Community Affairs, which had provided the funding for solar street lighting and solar water heaters, approved the transfer of the lights for installation at Lago Mar Park in Miami-Dade County. The money for the solar water heaters was awarded to the Community Action Agency for the installation of 50 solar water-heating systems in low-income single-family homes. Reductions for these measures are accounted for in Section A.3 (Switch to Alternate Lighting) and B.5 (Installation of Solar Water Heaters), respectively, in this Sector (Electrical Production/Use).

(b) Incorporate energy efficiency into public housing projects *(DERM, MDHA)*

The Department of Environmental Resources Management (DERM) is working with Miami-Dade Housing Authority (MDHA) to incorporate energy saving features into MDHA public housing projects currently underway.

B.2: Develop and market a Miami Herald Energy Guide targeting the homeowner and encouraging special pricing in building supply stores

In 1994, a "How To" energy efficiency guide was published in the Miami Herald. This guide included energy efficiency information about appliances, landscaping, roofing, windows, and many other energy efficient options for homeowners. Approximately 440,000 copies were distributed countywide. In addition, the U.S. Department of Energy requested permission to duplicate the document in an effort to promote energy efficiency in the rebuilding efforts following a major flood in the Midwest United States.

B.3: Develop outreach program for contractors/builders on the Florida Energy Code

The Building Code Compliance Office (BCCO) routinely sponsors local seminars for inspectors and contractors, which include highlights of the most recent revisions to the Energy Code.

B.4: Develop a strategy with the Department of Community Affairs (DCA) to improve enforcement of the Florida Energy Code

Staff from the Building Code Compliance Office is involved in seeking compliance through the Municipalities on the use of the Energy Code. Staff has participated in code changes of local and state building codes.

B.5: Installation of Solar Water Heaters on low-income housing units (DCA)

The Community Action Agency (CAA) is considered a community-based organization whose goal is to provide quality service that is efficient and customer driven. The agency implements programs such as Weatherization Assistance (WAP), Ultra-Low Flow Toilet and Showerheads, and Solar Water heating systems. These programs are geared towards making households energy efficient and allowing the homeowner to save valuable energy dollars in utility bills. The agency has installed a total of 350 solar systems, 50 of which were installed with funds originally earmarked for the Habitat for Humanity Jordan Commons project. As part of this initiative, CAA's Energy Programs has also been awarded money from Florida's Department of Community Affairs (DCA), Miami-Dade Department of Water & Sewer, and the Department of Environmental Resources Management (through the Department of Community Affairs) to continue the efforts in providing services to reduce poverty and help low-income individuals become self-sufficient.

The installation of the 357 solar water-heating units has resulted in an annual reduction of 141 tons of CO_2.

C. EXPAND THE USE OF ALTERNATIVE FUELS

C.1: Investigate cost effective energy efficient HVAC systems for Miami-Dade facilities

This measure was incorporated into Electrical Production/Use section A.1 (a) above, as part of the RFP 25 Program. Please see description in that section.

C.2: Reinstate renewable energy source exemption
No action was taken on this measure.

D. EXPAND THE USE OF LANDSCAPING AND WHITE SURFACES

D.1 Integrate Cool Communities with community-wide tree planting program (DERM, MDPR, DP & Z, PWD)

On May 21, 1992, the Board of County Commissioners authorized the County's participation in the Cool Communities program, which was sponsored by American Forests and the U.S. Department of Energy. Cool Communities was a county-wide program

focused on educating the public about saving energy through the strategic planting of trees and the energy saving benefits of white reflective roofs. **Throughout the eleven-year program (1992-2003), a total of 833 trees were planted resulting in an estimated annual average CO_2 emissions reduction of one ton per year and a total reduction of 10.41 tons.**

Other county programs have incorporated similar goals. Specifically, the Public Works Department's Roadway Tree Planting Beautification Program receives requests for tree planting from a wide variety of sources. The County's Landscape Committee reviews, approves, and prioritizes planting projects. Expenditures for these projects average $1,000,000 per year.

In addition, the Community Image Advisory Board (CIAB), manages several initiatives aimed at canopy restoration. Specific related Board priorities include 1) Create and implement the Aesthetic Master Plan, 2) Landscape enhancements along gateways, 3) Restore tree canopy lost during hurricanes, and 4) Educating the public. It is anticipated that these measures will greatly enhance the county's goal of increasing tree canopy. These projects are in addition to the Adopt-a-Tree Program described below in section D.4 Adopt-a-Tree Program.

D.2: Revise Landscape Code to require strategic tree planting, street trees, and parking lot trees

(a) Implement Revised Landscape Code to require strategic tree planting, street trees, and parking lot trees (DP & Z)

In December 1995, the Board of County Commissioners adopted Chapter 18A, The Miami-Dade County Landscaping Ordinance [36], requiring landscape planting standards and criteria for all development types to be applied in both the incorporated and unincorporated areas of Miami-Dade County. The Landscape Ordinance was revised in 1998 to include provisions for a faster and more comprehensive landscape plan review, a tree survey requirement, additional street tree requirements, a hierarchy of roadways, and a requirement to provide shade and visual edge along roadways. In addition, Resolution R-650-01 [37], passed and adopted on June 5, 2001, directed the County Manager to formulate a Master Plan for Street Trees, which is a requirement of the Landscape Code. Provisions of the Landscaping Ordinance and the Master Plan for Street trees continue to be implemented countywide.

A total of 36,242 new single-family units were built during the period 2001 - 2005. Assuming compliance of these units with the landscape ordinance, it is assumed that 108,726 (assume 3 per unit) trees were planted during this four-year period. These trees have the potential of reducing a total of **272 tons of CO_2** annually once they reach maturity. In addition, if trees were planted strategically as ordered by the ordinance, an additional annual reduction of **7,076 tons of CO_2** may be possible.[38]

A complimentary effort to develop minimum landscaping standards for the county's major "gateways", such as NW 27th Avenue and US1 is currently under way. The Department of Planning and Zoning is working in conjunction with the County's Community Image Advisory Board (CIAB) on this effort, which is expected to be completed by late Fall 2006.

D.3: Shade for Dade Tree Planting Program (DERM, MDPR)

In 2001 the County provided $100,000 to Fairchild Tropical Gardens and Operation Green Leaves to fund the Shade for Dade – Plant a Tree for the Millennium Program. The goal of the program was to increase the County's tree canopy, which is well below the national average, using native trees. Fairchild Tropical Gardens partnered with Community Based Organizations to plan several tree planting events. As of the end of the program in 2003, approximately 325 trees were planted, which is expected to result in estimated CO_2 emission reductions of approximately one ton per year.

Estimated CO_2 emission reductions are approximately one ton per year

D.4: Adopt-a-Tree Program (DERM, OCI)

A 1996 analysis by the non-profit organization American Forests, in partnership with DERM, determined that the tree canopy cover in unincorporated Miami-Dade County averaged only about 10% with some areas showing as little as 1-2% tree cover, critically below what is considered as adequate urban canopy. Faced with the declining canopy due to natural disasters, development, and citrus canker eradication, Miami-Dade County petitioned the State Department of Agriculture for $3.5 million for the proposed canopy program and in December 2000 Miami-Dade County was awarded more than the requested amount - $6 million to focus on the planting and care of new trees.

The resulting Adopt-a-Tree program, kicked-off on July 27, 2001, was developed from the input of community groups, agricultural interests, and government agencies seeking to heal from this loss and to foster a heightened awareness of the value of shade trees in the community. Miami-Dade single-family or duplex homeowners are eligible to adopt two free trees each year, which are distributed at events throughout the community during the rainy season. Because the program is designed to help bolster the condition of our community's tree canopy, the trees selected for "adoption" are ones that make good shade trees in their maturity. The program provides both native "ornamental" shade trees and a variety of non-citrus fruit trees and includes a multilingual educational component addressing appropriate placement, planting procedure and long-term maintenance of the adopted trees. In the past six years since its inception, the Adopt-a-Tree has educated thousands of Miami-Dade residents and planted 97,000 lost trees, resulting in an **estimated CO_2 emission reductions of approximately 171 tons per year.**

E. PROMOTE AND EXPAND PARTICIPATION IN ENERGY CONSERVATION

E.1: Increase public participation in Florida Power & Light's (FPL) Demand Side Management (DSM) Programs

FPL's Demand Side Management (DSM) Program helps individual customers reduce their demand for electricity. It includes numerous programs for residential, industrial, and commercial customers and more information about the individual programs can be found on FPL's website at http://www.fpl.com/ [39]. In May 2006, FPL filed a proposal with the Florida Public Service Commission (PSC) to enhance its energy conservation initiatives associated with the DSM Program. If the proposal is approved it will result in the addition of two new programs and increases in money-saving incentives available to residential and business customers who participate. In the last two decades, this partnership between FPL and Miami-Dade County residents has been very successful, reducing demand for energy by over 800 megawatts and helping to avoid the construction of more than two power plants.

During the first ten years of the DSM program CO_2 emissions were reduced an average of 4,654 tons/year. However, during the past six years, participation has increased dramatically, leading to an **average annual CO_2 emission reduction of over 448,290 tons/year between the years 2000 to 2005.** This equates to a total of **approximately 2,694,398 tons of CO_2 emissions reduced since the DSM Program began in 1990. Averaged out over the timeframe of the Plan, this would equate to approximately 168,400 tons of CO_2 emission reductions per year.**

E.2: Adequately staff utility division of M-D Department of Facilities Management to investigate various rate structures that encourage & reward utilities for energy conservation

Available electric rate tariffs have been, and are currently reviewed by staff to ensure that county facilities utilize the most cost effective rate structure. Broader energy management initiatives should be evaluated for applicability to County operations; however, budgetary constraints have prevented GSA from establishing and/or filling staff positions that would enable such proactive research.

E.3: Promote Energy Conservation and Assistance Program (ECAP)

No formal action was ever taken to implement the ECAP Program, however new opportunities arose to implement other similar programs. These are reported below.

E.4: EPA ClimateWise Program (DERM)

DERM was awarded funding to implement EPA's ClimateWise Program during the years 1996 – 2000. During this time, a total of 31 companies joined the program and began implementing energy efficient and waste reduction programs within their facilities. The Environmental Protection Agency (EPA) officially merged the ClimateWise program into

the Energy Star Program in 2001, which resulted in the funding for this program being discontinued. As resources allow, DERM plans to continue to periodically follow-up with the facilities and document further energy and waste reduction savings.

Based on the energy savings documented during implementation of the ClimateWise Program, **it is estimated that these companies are reducing approximately 224,619 tons of CO_2 per year**, which equates to **a total CO_2 emissions reduction of approximately 2,246,190 tons since the Program was initiated in 1996.**

E.5: Promotion of energy conservation and waste reduction to businesses and homeowners (DERM)

Miami-Dade DERM continues to utilize the Department's website to promote waste reduction [40] and energy conservation tips [41] to the business and residential community. Since this measure results in definite, but indirect, benefits to the community, there is no quantifiable data available to calculate CO_2 Emissions reductions.

E.6: Miami-Dade Green Coalition (DERM, GSA)

The Miami-Dade Green Coalition was established in 1996 by Miami-Dade County's Environmental Advisory Task Force. Its mission was to "...increase the sustainability of Dade County by incorporating land planning, design, building products and operation that will reduce resource consumption and maintain healthy urban environments and productive agriculture while protecting the natural systems for future generations." The Coalition was made up of representatives from diverse backgrounds and expertise including Miami-Dade County departments, local building and architectural firms, local universities, Florida Power and Light (FPL), the South Florida Water Management District, the Governor's Commission for a Sustainable South Florida, and many others. In April 1997, the Coalition hosted the First South Florida Sustainable Building Conference in Miami, attracting more than 40 exhibitors and 300 attendees and speakers. At the conclusion of the conference, a "Green Action Agenda"[42] was compiled and published by the Coalition, to bring all the suggestions and impediments offered at the conference together in one document. The Coalition continued to meet regularly through 2000 and participate in community events and projects in an effort to facilitate implementation of their Green Action Agenda.

However in 2001, participation in the Committee waned and the decision was made to dissolve the Dade Green Coalition since the recently formed Florida Green Building Coalition[43] (FGBC) was working towards the same goals on a statewide level, and had more organizational and financial support. In fact the Florida Green Building Coalition published the Florida Green Building Standard for Homes in July 2001, which is intended to establish a voluntary, statewide standard for Green Home Designation. Since this document was published, the FGBC has published similar standards for development, commercial buildings, and local government operations. These are all available on the FGBC website[44].

SOLID WASTE SECTOR

Miami-Dade County currently has the largest government owned and operated waste collection and disposal system in the southeastern United States. The Department of Solid Waste Management (DSWM) provides waste collection and recycling services to over 300,000 households in unincorporated Miami-Dade County and eight municipalities, and collected over 3, 800,00 tons of solid waste in 2004. The County has had a recycling program since 1990 and owns and operates the most technologically advanced waste-to-energy facility in the world.

A. RECYCLE BETWEEN 30% AND 50% OF MIAMI-DADE COUNTY'S WASTE STREAM

A.1 Continue to implement and promote the County's residential & commercial recycling programs (DSWM)

Miami-Dade County Department of Solid Waste Management (DSWM) continues to promote and implement its community recycling, originally established in 1990. Existing recycling programs include residential single family, residential multi family, and commercial sectors. Material recycled includes newspaper, glass, aluminum cans, plastic bottles, steel cans, C&D debris, yard trash, white goods, tires, process fuels and other waste materials such as others plastics, ferrous metals, non-ferrous metals, corrugated paper, office paper, other paper, food, textiles, and miscellaneous. In 2001, DSWM initiated an electronics recycling program which allows residential customers to bring in monitors, TVs, computer CPUs, printers, circuit boards, hard drives, keyboards, and other miscellaneous equipment such as VCRs, stereos, etc.

A slow, general decline in recycling rates can be seen since the year 2000. Service issues by the County's recycling contractor and a decrease in promotion of the County's recycling programs contributed to the decline. Those issues are being addressed in a competitive procurement program, which is currently underway. Additional information on the County's recycling programs can be found on the **DSWM Website** [45]. Below are the tonnages recycled between the years 2000 and 2004.

Year	Recycling Percent	Tons of materials Recycled
2000	25%	1,016,625
2001	20%	794,431
2002	18%	717,978
2003	19%	746,991
2004	18%	709,215
2005*	-	797,048

* *Since the data was not yet published for 2005, it was necessary to estimate the anticipated totals, using the historical data available for 2000 – 2004.*

Total CO_2 emissions reduced (1990-2005) due to recycling are equal to 25,978,896 tons, which is equivalent to 1,623,681 tons per year.

A.2 Continue to promote and implement the County's internal (Gov't facilities) recycling program. (DERM)

Miami-Dade Resource Conservation Committee (MDRCC) (DERM)
This Committee, originally established in 1992 as the "Recycling Management Committee" under the County's GSA Department, was transferred to DERM jurisdiction and renamed the MDRCC by Resolution R-374-03 in April 2003. As per Resolution R-374-03 the Committee has further expanded its focus beyond recycling to include more research and promotion of Environmental Preferable Purchasing (EPP) initiatives that may benefit County departments and operations. Since the passage of the Resolution, Committee members have been actively working on numerous projects. More information can be found on the Committee's website at **MDRCC Website** [46]which also includes tips and resources for recycling, waste reduction, and Environmentally Preferable Purchasing.

Paper Recycling in County Departments - A new office paper recycling bid was published and awarded to EcoPaper Recycling Corporation on March 1, 2004. During the period of March 2004 through December 2005, County departments recycled a total of 688 tons of office paper, resulting in a reduction of 3,497 tons of CO_2.

Estimated CO_2 emission reductions related to County department paper recycling are approximately 1,907 tons per year.

B. RECOVER AND UTILIZE LANDFILL METHANE GAS

B.1 Recover and flare or use the landfill gas from the South Dade Landfill to generate electricity for the South District Wastewater Treatment Facility (DSWM, WASD)

Collection and flaring of gas from the North and South Dade Landfills continues to be implemented. In February 2003, the passive system at North Dade Landfill was converted to an active recovery system, improving the efficiency of recovery. The recent recovery amounts and resulting emissions reductions are reflected in the table below. It is important to note that flaring the gas converts Methane to CO_2 and water, therefore increasing the overall amount of CO_2 emissions. However, since Methane is twenty-one times more potent a greenhouse gas than CO_2, this is seen as an overall benefit to the County's climate change mitigation activities.

NORTH DADE LANDFILL		SOUTH DADE LANDFILL	
METHANE BURNED		METHANE BURNED	
YEAR	CH_4 *MCuFt*	YEAR	CH_4 *MCuFt*
2005	564.82	2005	787.97
2004	554.33	2004	762.75
2003	546.38	2003	741.14
2002	124.53	2002	733.03
2001	205.36	2001	725.23
2000	213.86	2000	716.22
Total	2,209.28	Total	4,466.34

The ultimate goal of this initiative is to capture gas from the South Dade Landfill and utilize it to generate electricity for the South District Wastewater Treatment Facility, thus reducing CO_2 emissions from both the landfill, and from energy production for electricity used at the wastewater treatment plant. Efforts are underway to utilize the recovered gas for energy. The Solid Waste Management Department (DSWM) and the Water and Sewer Department (WASD) signed a memorandum of understanding (MOU) on February 9, 2004 where DSWM will supply a continuous 350 CFM of landfill gas from the South Dade Landfill to WASD's South District Wastewater treatment plan. WASD is currently in the process of hiring a consultant for a design/build contract for the required pipeline, to bring the gas to the South District Wastewater Treatment Plant. Furthermore, WASD is also conducting a cost effective analysis of installing additional co-generation units to be able to fully utilize all of the available gas. Progress of this project will continue to be monitored.

Estimated CO_2 emission reductions are approximately 300,763 tons per year.

B.2 Recover and flare methane gas from the North Dade Landfill

See information in Section B.1 above, where information about the North Dade Landfill is included with information on the South Dade Landfill. The North Dade Landfill is given its own section in the Report because it was not included in the original Urban CO_2 Reduction Plan.

Estimated CO_2 emission reductions are approximately 148,773 tons per year.

C. REDUCE GENERATED SOLID WASTE BY UP TO 5%

C.1 Implement Community–wide reduction programs

(a) ReduceYourWaste.org Website *(DERM & DSWM)*
As a result of a collaborative effort between the Department of Environmental Resources Management, Solid Waste Management, and the Information Technology Department an interactive Internet database-driven web site called "ReduceYourWaste.org" [47]was created

in 2002. Since its development the website has served as an interactive tool to help businesses manage their waste effectively. Through a 5-step process businesses are able to select an industry waste characterization profile, customize it based on their actual volumes, and then select materials to view waste reduction options and recycling options. The information on recycling options includes a list of local vendors that accept the recyclable materials and there is guidance material on how to establish a successful program. Vendor contact information is added/updated for a couple of vendors each year, by their request. There is no method for determining the number of businesses that actually implement/update recycling programs or the quantity and type of materials recycled as a result of information found on the website, however the website provides an additional source of information and resources for the industrial and commercial business community.

(b) Promote/Provide Recycling and Waste Reduction Information to the Community *(DERM & DSWM)*

Both DERM [48] and DSWM [49] continue to promote waste reduction to the residential, commercial and industrial sectors by providing information on their websites and by participating in community events. Furthermore, DSWM hosts two special Home Chemical Collection (HCC) Events each year in addition to maintaining two permanent Home Chemical Collection Centers where residents may drop off hazardous home chemicals and materials. The special HCC Events are generally held in the spring and fall of each year. In 2004 and 2005, a total of 322,097 lbs. of waste was collected at the permanent HCC Centers, and a total of 75,896 lbs. was collected at the special events. No CO_2 emissions reduction calculations are available for this measure.

C.2 Implement waste reduction purchasing practices in Miami-Dade

(a) Establish waste-reducing purchasing policy *(GSA Procurement Division, DERM)*

In 1991, Resolution R-214-92 established a procurement policy for Metropolitan Dade County favoring waste-reduction and implementing a program to purchase commodities containing recycled or recyclable content. This resolution also established the Recycling Management Committee, which was comprised of representatives from various county departments and was responsible for promoting recycling to County departments, facilitating departments' recycling activities, and assisting in the procurement of "recycled products and recyclable products."

This committee focused primarily on recycling activities in county operations until 2004, when Resolution R-374-04[50] was passed, renaming the Committee as the Miami-Dade Resource Conservation Committee, and refocusing the committee's efforts on waste reduction and Environmentally Preferable Purchasing. Additional details are included in Solid Waste Sector section A.2 above.

(b) Implement Environmentally Preferable Purchasing Program *(DERM, DPM)*

As mentioned above (Item A.2), the Miami-Dade Resource Conservation Committee and DERM help promote and implement Environmentally Preferable Purchasing in County departments and operations. This includes purchase of recycled-content products, as well as purchase of products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. EPP initiatives being implemented include purchasing of hybrid electric vehicles, natural gas, recycled-content office supplies, recycled-content office paper and janitorial paper supply products, and less toxic janitorial supplies and services using the GreenSeal language in contracts. The most recent report documenting these efforts, "Summary Report for Recycling and Environmentally Preferable Purchasing for the Period of April 1, 2003 – March 31, 2004," was published in August 2004. CO_2 Emissions reductions have not been calculated for these measures, but other environmental benefits and program details can be found in the Report, which is available on the Resource Conservation Committee's website[51].

D. Recover & Utilize Methane from Waste Water Treatment Sludge

Miami-Dade Water and Sewer Department (WASD) has been collecting and utilizing Methane for energy use for at least 12 years. The biological treatment of sanitary sewage generates semi-solid liquids commonly referred to as "sludge". This by-product of the wastewater treatment process, when properly treated, can be beneficially used. The treatment provided consists of thickening (a form of dewatering), stabilization or digestion, and drying. Because sludge is composed primarily of organic matter, during the process of anaerobic (in the absence of oxygen) digestion, methane gas is produced. Often, these gases are flared or burned. At the Miami-Dade Water & Sewer Department's Central and South District Wastewater Treatment Plants, the methane gas generated by this process is collected and used as fuel to power electric generators that supply a significant percentage of the electric power consumed at these treatment plants.

WASD has been able to produce 27,102,332 KWH of electricity annually from the wastewater treatment sludge with this measure, for an estimated CO_2 emission reduction of approximately 16,697 tons per year.

SUMMARY CHART OF SECTOR MEASURES AND ASSOCIATED CO_2 REDUCTIONS

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
TRANSPORTATION						
A. Mass Transit and Road Improvements		**818,000**	**4,099**			
1) Expansion of Metromover to Brickell and Omni	Completed (1995-2005)		1,939	9,694	11,633	21,327
2) Extend Transit						
a) South Dade Busway Extension	On going (1997-2005)		1,978	6,787	12,990	19,777
b) Extend Metrorail to Palmetto Expressway	Completed (May 2004 – 2005)		182	0	288	288
c) Peoples' Transportation Plan (PTP)	On going (2002–2005)		Indirect Measure - Emissions reductions not able to be quantified			
d) Additional Transit Projects Underway	On going (2002–2005)		Projects not yet completed - Emissions reductions not able to be quantified			
3) Construct road improvements listed in the Long Range Transportation Plan consistent with other transportation and land use measures in this plan.	On going (1993–2005)		Indirect Measure - Emissions reductions not able to be quantified			
B. Increase Traffic Demand Management Programs		**62,000**	**12,069**			
1) Electrowave	Discontinued (1998 - Sep. 2005)		785	2,258	3,824	6,082
2) South Florida Commuter Services Program	On going (2002-2005)		7,532	0	30,128	30,128
3) Vanpool Program	On going (1999-2005)		3,752	358	22,152	22,510

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	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
C. Promote increased use of Bicycles		**151,000**	**585**			
1) Adopt (& implement) policy incorporating bicycle facilities into road construction or reconstruction projects.	On going (1995-2005)		Indirect Measure - Emissions reductions not able to be quantified			
2) Adopt a shower facility ordinance for professional office buildings & require non-residential and non-retail developments provide bicycle racks at a minimum rate of five parking spaces for every 100 automobile parking spaces as stated in the Draft Bicycle Facility Plan	No Action		-			
a) Adopt a shower facility ordinance	No Action		-			
b) Provide bicycle racks as stated in the Draft Bicycle Facility Plan	Completed (July 1999 - 2005)		Indirect Measure - Emissions reductions not able to be quantified			
3) Expand Bikes-on-Trains Program to include counter-flow & first-hour service.	Completed (1999-2005)		508	Data not Available	2,540	2,540
4) Implement Bikes on Tri-Rail	Completed (1996-2005)		77	307	460	767
5) Investigate utility easements, transit, and railroad rights-of-way to use for bicycle/pedestrian facilities.	On going (1995-2005)		Indirect Measure - Emissions reductions not able to be quantified			

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
D. Increase Fuel Efficiency		**8,200,000**	**104**			
1) Utilize more fuel-efficient cars in the Miami-Dade fleet.						
a) CNG Vehicles at Miami International Airport	Discontinued (1997-2001)		Emissions reductions not able to be quantified			
b) Hybrid Electric Vehicles in GSA Fleet	On going (2002-2005)		104	0	417	417
c) Determine the viability of using County cars for electric vehicle prototype in conjunction with DOE, the Electric Power Research Institute, and the local power company. (N)	No Action		-			
2) Develop a public education and awareness campaign to limit idling of automobiles/trucks.	On going 1993 - 2005		-			
3) Develop a team of local public/private representatives to identify and promote the most practical and cost effective alternative fueled vehicles.	Completed (2002-2005)		Indirect Measure - Emissions reductions not able to be quantified			
4) Promote an increase in national gas mileage standards to 45 mpg.	No Action		-			
E. Reduce Vehicle Miles Traveled through Technology Improvements		**0**	**751**			
1) Voice Response System	On going (1996-2005)		578	1,429	4,348	5,777
2) Simultaneous Paperless Image Retrieval Information Technology (SPIRIT)	On going (1998-2005)		173		173	173

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
LAND USE						
A. Reduce Vehicle Miles Traveled by 5% through mixed land use		**172,000**	-			
1) Review & amend regulations to encourage implementation of transit & pedestrian oriented development (TOD) principles in new development.	On going (1995 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
2) Encourage infill development by requiring utilization of TOD development principles within activity centers & along major transit corridors.	On going (1995 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
a) Community Urban Centers	On going (1995 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
b) 2003 Evaluation and Appraisal Report (EAR)	On going (2003 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
c) Residential Density Feasibility Study (EAR/CDMP)	Completed (2001)		Indirect Measure - Emissions reductions not able to be quantified			
d) Eastward Ho! Brownfield's Partnership	On going (1997 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
3) Continue to promote evolution of a sub-centered urban form…(and) promote applicable TOD principles & the balanced provision of convenience retail, personal services, & various types of residences.	On going (1995 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
a) Build/Establish County offices @ Metrorail stations (N)	On going (2001 -2005)		Indirect Measure - Emissions reductions not able to be quantified			

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
4) Encourage provision of civic buildings within urban neighborhoods through site planning and capital improvement programming.			Indirect Measure - Emissions reductions not able to be quantified			
a) School Facility Planning	On going (1997 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
b) Team Metro Office locations	On going (1992 -2005)		Indirect Measure - Emissions reductions not able to be quantified			
ELECTRICAL PRODUCTION/USE						
A. Increase efficiencies of Miami-Dade facilities/operations		**145,000**	**29,698**			
1) Initiate "Green Lights" Programs & integrate with other County building retrofits for a 20% increase in efficiency						
a) Implement Energy Performance Contracts to increase energy efficiency of Miami-Dade County buildings. (Includes lighting, HVAC, etc.)	In Progress (2000-2005)		5,887	0	35,322	35,322
2) Purchase the combined cycle cogeneration plant and wheel current excess capacity …to County-owned facilities & promote use of cogeneration for other appropriate applications.	No Action		-			
3) Switch to Alternate Lighting						
a) Solar lights at parks	On going (2001-2005)		Indirect Measure - Emissions reductions not able to be quantified			
b) Solar powered Bus stops	On going (2005)		1,794	0	1,794	1,794
c) Convert Traffic signals to LED technology lighting (PWD)	On going (2002 – 2005)		148	0	592	592

63

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
4) Implement Energy Star Management Tool (DERM & WASD)	Completed (2005)		281	0	281	281
5) Miami Dade Aviation Department						
a) MIA Incinerators removal	On going (July 2001-2005)		19,976	0	89,891	89,891
b) Fuel savings due to west end tender facility	On going (July 2004 - 2005)		221	0	332	332
c) Fuel savings due to and pre-conditioned air and power at gates	On going (2005)		1,391	0	1,391	1,391
6) Water and Sewer Department's (WASD) energy efficiency Process Improvement Team (PIT)	On going		Indirect Measure - Emissions reductions not able to be quantified			
B. Decrease residential sector energy use		**159,000**	**141**			
1) Reduce annual electricity consumption by 5,350 kWh in 35,000 rebuilt homes in South Dade through promotion of energy efficient measures.						
a) Reduce electricity consumption in rebuilt homes for Habitat for Humanity's Jordan Commons Project in South Miami-Dade County.	Discontinued (1995 – 1998)		Indirect Measure - Emissions reductions not able to be quantified			
b) Incorporate energy efficiency into public housing projects	On-Going (2001 – 2005)		-			
2) Develop & market a Miami Herald energy Guide targeting the homeowner and encouraging special pricing in building supply stores.	Completed 1995		Indirect Measure - Emissions reductions not able to be quantified			
3) Develop outreach program for contractors/builders on Florida's Energy Code.	On going (1997-2005)		Indirect Measure - Emissions reductions not able to be quantified			

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
4) Develop strategy with DCA to improve enforcement of the Florida Energy Code.	On going (1997-2005)					
5) Installation of Solar Water Heaters	Completed (1996-2005)		141	0	705	705
C. Expand the use of Alternative Fuels		**51,000**	-			
1) Investigate cost effective energy efficient HVAC systems for Miami-Dade facilities. (Included in A.1.a above)	On going (2000-2005)		See A.1.a of Electrical Production/Use above			
2) Reinstate renewable energy source exemption	No Action		-			
D. Expand the use of landscaping and white surfaces		**137,000**	**445**			
1) Integrate Cool Communities with community-wide tree planting program.	Completed (1992-2003)		1	7	4	11
2) Revise Landscape Code to require strategic tree planting, street trees, and parking lot trees.	Completed (Dec. 1995)					
a) Implement Revised Landscape Code County-wide	On going (2001-2005)		272	0	1,359	1,359
3) Shade for Dade Tree Planting Program	Completed (2001-2003)		1	0	4	4
4) ADOPT-A-TREE	On going (May 2001-2005)		171	0	800	800

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Total Tons)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
E. Promote and expand participation in energy conservation		**610**	**393,019**			
1) Increase public participation in FPL's Demand Side Management (DSM) Programs.	On going (1990-2005)		168,400	4,654	2,689,744	2,694,398
2) Adequately staff utility division of M-D Dept. of Facilities Management to investigate various rate structures that encourage & reward utilities for energy conservation.	No Action		-			
3) Promote Energy Conservation & Assistance Program (ECAP).	No Action		-			
4) EPA Climate Wise Program. (N)	Discontinued (1996-2001)		224,619	898,476	1,347,714	2,246,190
5) Promotion of energy conservation and waste reduction to businesses and homeowners	On going (2000-2005)		Indirect Measure - Emissions reductions not able to be quantified			
6) Dade Green coalition	Discontinued (1996 -2000)		Indirect Measure - Emissions reductions not able to be quantified			
SOLID WASTE						
A. Recycle between 30% and 50% of Miami-Dade County's waste stream		**1,188,000**	**1,625,588**			
1) Continue to implement and promote the County's residential & commercial recycling programs.	On going (1990-2005)		1,623,681	11,813,800	14,165,096	25,978,896
2) Continue to implement and promote the County's internal (Gov't facilities) recycling program.	On going (Apr 2003 – 2005)		1,907	Data Not Available	3,497	3,497

	STATUS	1988 FORECAST (Tons/year)	Actual Average (Tons/year)	Start - 1999 ACTUAL (Tons/year)	2000 - 2005 ACTUAL (Total Tons)	(Start - 2005) ACTUAL (Total Tons)
B. Recover and utilize landfill methane gas		**177,000**	**449,536**			
1) Recover & flare or use methane gas to generate electricity for the South district Waste Water Treatment Facility.	On going (2000-2005)		300,763	0	1,804,580	1,804,580
2) Recover & flare methane gas from the North Dade Landfill (N)	On going (2000-2005)		148,773	0	892,638	892,638
C. Reduce generated solid waste by up to 5%		**388,000**	-			
1) Implement community-wide reduction programs.						
a) ReduceYourWaste.org Website	On going (2002 – 2005)		Indirect Measure - Emissions reductions not able to be quantified			
b) Promote/Provide Recycling and Waste Reduction Information to the Community	On going (1992 - 2005)		Indirect Measure - Emissions reductions not able to be quantified			
2) Institute waste reduction purchasing practices in Miami-Dade County Departments.						
a) Establish waste-reducing purchasing policy	Completed 2003		Indirect Measure - Emissions reductions not able to be quantified			
b) Implement Environmentally Preferable Purchasing	On going (2003 – 2005)		Indirect Measure - Emissions reductions not able to be quantified			
D. Recover & Utilize Methane from Waste Water Treatment Sludge	On going (1993-2005)	**0**	16,697	100,182	100,182	200,364
TOTAL GHG REDUCTIONS		**11,648,610**	**2,532,732**			**34,062,831**
	Without CAFE Standards	**3,448,610**				

Chapter 4

Conclusion & Recommendations

As one of the early participants in ICLEI's Cities for Climate Protection Campaign, Miami-Dade County was one of the first local jurisdictions to recognize the potential impacts of global climate change and to adopt a greenhouse gas reduction plan. The County has come far and made great strides in its climate change mitigation efforts, learning many important lessons along the way. The Urban CO_2 Reduction Plan evolved and adapted over the years to eliminate or modify those measures that did not yield sufficient benefits, and to incorporate new opportunities as they arose. Although the Plan primarily focused on making changes in internal County operations, significant reductions also resulted from measures involving the community such as FPL's Demand Side Management Program, the County's commercial and residential recycling programs, and EPA's ClimateWise Program. This highlights the tremendous potential for emission reductions when initiatives involve the community, and shows that a collaborative, countywide effort that includes the residential, industrial, commercial, and transportation sectors can greatly enhance the success of a climate change mitigation program.

With the recent passage by the Miami-Dade Board of County Commissionersof legislation supporting solar industries, fuel conservation, green buildings, and climate change adaptation (See chart of Local Legislation Pertaining to Miami-Dade County Urban CO_2 Reduction Plan in the Appendix), this is an extremely exciting time for Miami-Dade County, as it relates to sustainable government initiatives. The recommendations provided below will facilitate the success of these initiatives and provide the foundation for further improving our efforts in reducing greenhouse gas emissions throughout Miami-Dade County:

- Re-evaluate all measures implemented in the Urban CO_2 Reduction Plan to identify and prioritize those programs that yield the most effective and measurable results. Resources should be allocated accordingly, based on the effectiveness and measurability, and documentation of those programs that do not yield measurable results should be minimized or eliminated.

- Identify and work with additional partners and allies at the local, state, and federal levels, in an effort to enhance resources available for climate change mitigation

and adaptation initiatives. Potential partners include, but are not limited to, local municipalities and universities, the Miami-Dade County Public School system, industrial and commercial business organizations, local construction and building associations, and the South Florida Chapter of the U.S. Green Building Coalition.

- Provide adequate staffing and resources to newly formed committees that support the County's efforts in greenhouse emission reductions, such as the newly created Climate Change Advisory Task Force and the Sustainable Buildings Committee, and potential membership in the Chicago Climate Exchange (CCX) to enable them to move forward in a timely manner and make significant and measurable progress.

- Incorporate the development of a new climate change mitigation plan into the responsibilities of the Climate Change Advisory Task Force, to facilitate a strong and necessary connection between local climate change mitigation efforts and adaptation efforts. The development of a new plan should include new goals and timelines, based on current information and lessons learned from implementation of the original Plan. Adaptation efforts will call for a vigorous analysis of potential impacts and how to prepare for their mitigation. A unified annual report on all county environmental initiatives prepared by the County Manager for review by the BCC will be prepared.

- Consider endorsing the US Mayor's Climate Protection Agreement[52], particularly since Miami-Dade County has long been considered a leader in taking action to reduce greenhouse gas emissions and is already implementing many of the actions recommended in the Agreement. Joining the 319 other local governments who have already signed this Agreement would demonstrate Miami-Dade County's commitment and continued leadership in addressing global warming and climate change.

- More effectively coordinate and facilitate Miami-Dade County government efforts in sustainable development and operations. Since these initiatives span all levels and departments of County operations, a strong mandate, as well as central authority and coordination, are critical to the success of subsequent programs addressing these important issues. This will also facilitate beneficial partnerships that will allow Miami-Dade County to further leverage its resources.

- Consider applying for the Florida Green Buildings Coalition's "Green Local Government Designations Standard for Cities & Counties"[53] in Florida, since Miami-Dade County is already implementing many sustainable government initiatives that qualify under the designation. This will offer Miami-Dade County positive publicity for the many proactive programs already being implemented.

- Actively provide outreach to the community and engage them in efforts being taken by Miami-Dade County and its partners to minimize fuel and energy use, reduce greenhouse gas emissions, and adapt to future climate change impacts.

Miami-Dade County has taken great strides forward in its sustainability efforts, including climate change mitigation and adaptation. The goal of this Report has been to provide a snapshot of the measures implemented over the 13 year period of Miami-Dade County's Urban CO_2 Reduction Program, to provide the results achieved, and to relay primary lessons learned along the way. It is hoped that this document will be a valuable resource for other jurisdictions that are implementing their own climate change mitigation programs and will be used as a building block for Miami-Dade County's future climate change mitigation and adaptation efforts.

APPENDIX A

LOCAL LEGISLATION PERTAINING TO MIAMI-DADE COUNTY URBAN CO_2 REDUCTION PLAN

Resolution Number*	Title
R-35-91	Resolution authorizing Dade County's participation in ICLEI's Cities for Climate Protection Campaign.
R-335-91	Resolution authorizing application to the International Council for Local Environmental Initiatives to participate in the urban CO_2 initiative, committing staff resources, stating intent to implement specific CO_2 reduction projects and develop a long term CO_2 reduction plan by 1993.
R-554-94	Resolution urging Congress and the President to sign legislation increasing the CAFE standards to 45 miles per gallon to significantly reduce carbon dioxide emissions, a major contributor to global warming.
R-1323-97	Resolution urging Congress to support House concurrent resolution 106 to protect the earth's climate
R-1148-98	Resolution ratifying the County Manager's action to apply for, accept and execute a grant in the amount of $60,000 from the International Council for Local Environmental Initiatives for the Climate Wise Program
R-1356-99	Resolution ratifying the County Manager's action of executing a grant from the International Council for Local Environmental Initiatives for the Climate Wise Program; and authorizing the County Manager to exercise the modification provisions contained therein
R132-99	Resolution authorizing Miami-Dade County's participation in the Cities 21 project sponsored by the International Council for Local Environmental Initiatives
R-966-00	Resolution urging State and Federal action and response planning regarding global warming
R132-99	Resolution authorizing the purchase of model 2003, Toyota Prius hybrid vehicles under the cooperative contract competed by the Florida Sheriff's Association and the Florida Association of Counties
R-756-01	Resolution accepting a grant from the International Council for Local Environmental Initiatives for the promotion of Miami-Dade County's Energy Star Program for Business
R-969-03	Resolution directing County Manager to develop and implement a Plan for reduction in the County's consumption of gasoline and to take certain actions to increase fuel

	efficiency of the County's vehicle fleet.
R-374-03	Resolution establishing a Policy for Miami-Dade County favoring waste-reduction, environmentally-based promotional activities and the purchasing of commodities containing recycled or recyclable content
Ord #050971 (4/19/05)	Ordinance creating program for expedited review and approval of building permit applications for green buildings; defining green buildings; providing for administrative order; creating Section 8-8 of the code; providing severability, inclusion in the code, and effective date
Ord # 050933 (05/15/05)	Ordinance amending Sections 2-1254 and 2-1258, respectively, of the Code of Miami-Dade County, Florida, relating to the Targeted Jobs Incentive Fund Program (TJIF), adding eligible industry, modifying TJIF program parameters and adding additional bonus incentives; providing severability, inclusion in the Code, effective date and providing for sunset. This Ordinance added "Solar Thermal and Photovoltaic Manufacturing and Repair" as an eligible industry to the TJIF Program and also provides bonuses to companies with buildings or facilities qualifying as "green construction"
R-1200-05 (File #052213	Resolution declaring Sustainable Development Building Measures for County buildings as a policy of Miami-Dade County and directing the County Manager to prepare a plan to implement this policy
Ord # - 061152 (File #061152) (7/18/06)	Ordinance Creating the Miami-Dade County Climate Change Advisory Task Force; Providing for Membership, Organization and Procedure, Appointment and Tenure, Function and Responsibility; Providing Severability, Inclusion in the Code and an Effective Date

APPENDIX B

[1] http://www.co.miami-dade.fl.us/derm/globalwarming/library/co2plan-long-term.pdf

[2] Intergovernmental Panel on Climate Change, Climate Change 2001: Synthesis Report – Summary for Policy Makers: http://www.ipcc.ch/pub/un/syreng/spm.pdf

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

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

[5] ICLEI USA Year in Review 2005: http://www.iclei.org/documents/USA/documents/yearinreview/2005USAYIR-Final-Web.pdf

[6] The Kyoto Protocol to the United Nations Framework Convention on Climate Change: http://unfccc.int/resource/docs/convkp/kpeng.pdf

[7] The United Nations, The Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1998, Article 25, Pg. 19.

[8] US Conference of Mayors Climate Protection Agreement: http://www.seattle.gov/mayor/climate/PDF/Resolution_FinalLanguage_06-13-05.pdf

[9] Environment Opinion Study, Inc.; Poll conducted by Market Strategies, Inc. & Frederick/Scneiders, Inc., May 1991.

[10] The Urban CO2 Reduction Project Steering Committee, A Long Term CO2 Reduction Plan for Metroplitan Dade County, November 1993, p 30.

[11] Miami-Dade County Resolution # R-1200-05: http://www.miamidade.gov/govaction/matter.asp?matter=052213&file=true&yearFolder=Y2005

[12] US Green Building Council: http://www.usgbc.org/

[13] Transportation Component of Miami-Dade Strategic Plan: http://www.miamidade.gov/transit/library/pdfs/Strategic_Plan_Transportation.pdf

[14] http://www.miamidade.gov/transit/bikes.asp

[15] http://www.miamidade.gov/transit/transit_development.asp

[16] http://www.miamidade.gov/mpo/docs/MPO_lrtp_2030_final_20050107.pdf

[17] http://www.miamidade.gov/mpo/

[18] South Florida Commuter Services Program: http://www.1800234ride.com/index.html

[19] South Florida Vanpool Program: http://www.miamidade.gov/mpo/mpo8-plan-vanpool.htm

[20] Long Term CO2 Reduction Plan 2001Update Report: http://www.miamidade.gov/derm/globalwarming/library/co2report-2001.pdf

[21] http://www.miamidade.gov/mpo/mpo8-plan-bfp.htm

[22] Ordinance #99-81 for Bicycle Racks: http://www.miamidade.gov/govaction/matter.asp?matter=991841&file=false&yearFolder=Y1999

[23] http://www.miamidade.gov/transit/bikes.asp

[24] Miami-Dade Urban CO2 Reduction Plan webpage: http://www.miamidade.gov/derm/globalwarming/c02_reduction.asp

[25]http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.d0b5a45b55bfbe582f57529cdba046a0

[26] Environment Opinion Study, Inc.; Poll conducted by Market Strategies, Inc. & Frederick/Schneiders, Inc., May 1991.

[27]http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.d0b5a45b55bfbe582f57529cdba046a0

[28] http://www.miamidade.gov/planzone/about_zoning_code_rewrite.asp

[29]http://www.miamidade.gov/planzone/cdmp/2006April/April_06_Applications_Report.pdf

[30] http://www.miamidade.gov/planzone/udc/home.asp

[31] http://www.miamidade.gov/planzone/home.asp

[32]http://www.miamidade.gov/planzone/udc/Downtown_Kendall_Executive_Summary.pdf

[33] http://www.miamidade.gov/transit/corridor/n_corridor/n_project_description.asp

[34] http://www.miamidade.gov/teametro/locations.asp

[35] http://www.miamidade.gov/teametro/onthego.asp

[36] http://www.municode.com/Resources/gateway.asp?pid=10620&sid=9

[37] http://www.municode.com/Resources/gateway.asp?pid=10620&sid=9

[38] "Trees properly placed around buildings can reduce air conditioning needs by 30 percent and can save 20 —50 percent in energy used for heating." —*USDA Forest Service*

[39] http://www.fpl.com/

[40] http://www.miamidade.gov/derm/tips/you_help_business_waste.asp

[41] http://www.miamidade.gov/derm/Tips/tips_electricity.asp

[42]Green Action Agenda:
http://www.miamidade.gov/derm/globalwarming/c02_reduction.asp

[43] Florida Green Building Coalition: http://www.floridagreenbuilding.org/

[44] http://www.floridagreenbuilding.org/

[45] http://www.miamidade.gov/dswm/

[46] http://www.miamidade.gov/derm/Conservation/home.asp

[47] http://reduceyourwaste.org/

[48] http://www.miamidade.gov/derm/home.asp

[49] http://www.miamidade.gov/dswm/

[50] Miami-Dade County Resolution 374-03:
http://www.miamidade.gov/govaction/matter.asp?matter=031120&file=false&yearFolder=Y2003

[51] http://www.miamidade.gov/derm/Conservation/home.asp

[52] US Conference of Mayor's Climate Protection Agreement:
http://www.seattle.gov/mayor/climate/

[53] Florida Green Building Coalition's Green Local Government Designation Standard for Cities & Counties: http://floridagreenbuilding.org/standard/govs/default.htm

APPENDIX C

DEPARTMENT ABBREVIATIONS

CAA – Community Action Agency
COC – Clerk of Courts
DCA – Department of Community Affairs
DERM – Department of Environmental Resources Management
DPM – Department of Procurement Management
DP&Z – Department of Planning & Zoning
DSWM – Department of Solid Waste Management
FDOT – Florida Department of Transportation
FPL – Florida Power & Light
GSA – General Services Administration
MDAD – Miami-Dade Aviation Department
MDCPS – Miami-Dade County Public Schools
MDHA – Miami-Dade Housing Authority
MDPR – Miami-Dade Parks & Recreation
MDTA – Miami-Dade Transit Agency
MPO – Metropolitan Planning Organization
OCI – Office of Capital Improvements
OCED – Office of Community and Economic Development
PWD – Public Works Department
WASD – Water and Sewer Department

APPENDIX D

Resolution of the U.S. Conference of Mayors

ENDORSING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading US companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the US to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments throughout the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes

1. clear timetables and emissions limits and
2. a flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable buildingpractices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED that The U.S. Conference of Mayors endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges mayors from around the nation to join this effort.

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors will work in conjunction with ICLEI Local Governments for Sustainability and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

Adopted by the U.S. Conference of Mayors on June 13, 2005 .