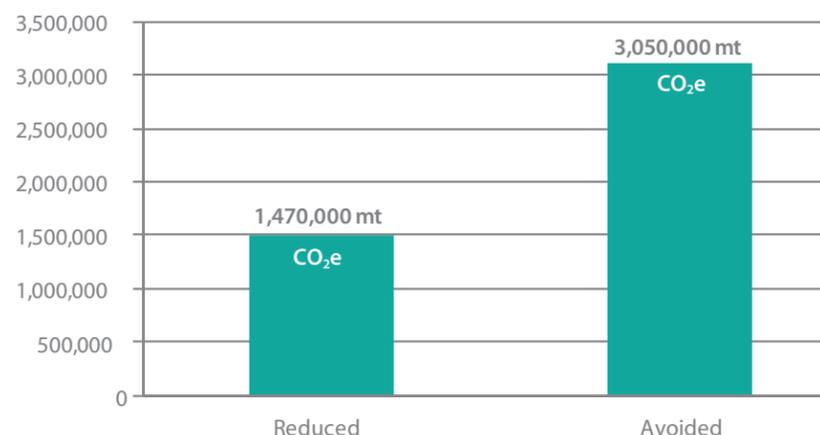




### Projected Greenhouse Gas Emissions to be Reduced and Avoided through GreenPrint 2015



The *GreenPrint* planning team calculated the impact of initiatives on Greenhouse Gas Emissions. Appendix A illustrates the assumptions used in identifying these impacts. The effort to calculate reductions was focused on *GreenPrint's* five-year timeframe and forecasts the results over an expected or hypothetical program lifetime when possible. Emissions avoidances, storage, and sequestration were also calculated as appropriate for each initiative. The results represent *GreenPrint's* contribution to pursuing Miami-Dade County's Cool Counties commitment of reducing emissions by 80 percent by 2050.

Since the calculated emission reductions and avoidances are estimates based on available data and assumptions, the numbers presented in Appendix A have been rounded for simplicity. Each Goal Area total represents the sum of the individual initiatives rounded to three significant digits. The projected emission reductions and avoidances from the individual initiatives are displayed using two significant digits.

Water and Energy Efficiency				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Incentivize energy efficient development</b>	Implement permitting process recommendations to increase green development. Aim to reduce energy use in residential sector for 350 retrofits and in commercial sector for 150 retrofits. Calculations assume 500 buildings per year, 70% Residential (350 bldgs) and 30% Commercial (150 bldgs); annual electricity consumption of 14,605 kWh/residential bldg and 114,247 kWh/commercial bldg; average area of 2,344 ft <sup>2</sup> per residential building and 3,266 ft <sup>2</sup> per commercial bldg; 80% of total energy use will be affected by the retrofitting; and the retrofitting will increase efficiency by 17%.	Residential Sector: 580 mt CO <sub>2</sub> e Commercial Sector: 1,950 mt CO <sub>2</sub> e	Each additional 5 years: Residential Sector: 580 mt CO <sub>2</sub> e Commercial Sector: 1,950 mt CO <sub>2</sub> e	Avoided: Residential: 1,550 mt CO <sub>2</sub> e over 5 years; Commercial: 6,760 mt CO <sub>2</sub> e over 5 years  Additionally, 100% compliance with Energy Code will avoid 390,000 mt CO <sub>2</sub> e (assumes 5% reduction from overall residential consumption by 2015)
<b>Implement EECBG projects</b>	This value includes all EECBG Projects except the Energy Efficiency Campaigns. This initiative was evaluated using the criteria as described in the EECBG Activity Worksheets for each project.	43,000 mt CO <sub>2</sub> e	Assumes a 20-year life on all projects: 193,000 mt CO <sub>2</sub> e	Avoided: 118,000 mt CO <sub>2</sub> e
<b>Promote and create innovative financing for energy efficiency</b>	Roll out a PACE program that enables 500 residential and 250 commercial property owners (per year) to finance energy and water efficiency performance improvements via their property taxes.  Calculations assume: annual electricity consumption of 14,605 kWh/residential bldg and 114,247 kWh/commercial bldg; 15% energy reduction per retrofit.	Residential Sector savings: 3,100 mt CO <sub>2</sub> e Commercial Sector savings: 12,000 mt CO <sub>2</sub> e	Each additional 5 years: Residential Sector savings: 3,100 mt CO <sub>2</sub> e Commercial Sector savings: 12,000 mt CO <sub>2</sub> e	Avoided: Residential: 9,200 mt CO <sub>2</sub> e Commercial: 36,000 mt CO <sub>2</sub> e
<b>Create a Miami-Dade Energy Alliance with a diverse group of stakeholders to implement sustainable energy and Retrofit government facilities in line with water efficiency audits</b>	Calculations assume a multiplier factor of 2 and emissions reductions from the campaigns initiative below.  Implement water efficiency retrofits in 39 buildings which were audited in the initial phase.	190,000 mt CO <sub>2</sub> e  18 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.  Calculations beyond 2015 were not available in 2010.	Avoided: 305,000 mt CO <sub>2</sub> e  Avoided: 92 mt CO <sub>2</sub> e
<b>Continue fuel reduction and monitoring programs</b>	Encourage fuel use reduction and maximum fuel efficiency whenever possible. Calculation assumes: 10% reduction in use for each fuel type (diesel, unleaded, B5, E10, natural gas, LPG, propane, and jet fuel) over five years.	25,000 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 76,000 mt CO <sub>2</sub> e
<b>Continue to transition fleet to hybrid gasoline-electric vehicles (sedans, buses)</b>	Continue to purchase / replace light fleet sedans and heavy fleet buses with more fuel efficient vehicle options. Calculations assume: annual mileage for fleet vehicles of 9,200 miles; average fuel efficiency of 18.21 mpg for fleet gasoline-powered sedans; average fuel efficiency of 42 mpg for fleet hybrid vehicles; average fuel efficiency of 80 mpg for PHEVs; average mileage per charge of 100 miles for Nissan Leaf; average mileage per charge of 40 miles for Chevy Volt; average annual mileage of 44,000 miles for bus fleet; average fuel efficiency of 3.4 mpg for fleet non-hybrid buses; average fuel efficiency of 3.9 mpg for fleet hybrid buses; No. of active hybrid vehicles: 329; No. of inactive hybrids made active: 103; No. of hybrid buses purchased: 254	4,000 mt CO <sub>2</sub> e	2,200 mt CO <sub>2</sub> e over 7-year life of vehicle	Avoided: 10,000 mt CO <sub>2</sub> e over 5 years
<b>Continue pilot project for vehicular technologies and alternative fuels that reduce net GHGs, such as hybrid-hydraulic diesel garbage trucks.</b>	Replace some traditional garbage trucks with hybrid hydraulic-diesel trucks. Plan is to purchase 126 of these trucks over the next 5 years with a 7 years for life of engine Calculations assume: 2,400 gallons of diesel fuel savings per year per truck	2,900 mt CO <sub>2</sub> e	Each additional hybrid hydraulic diesel garbage truck can potentially reduce emissions 23 mt CO <sub>2</sub> e	Avoided: 7,800 mt CO <sub>2</sub> e
<b>Develop a process that facilitates delivery of diesel fuel to MIA from Port Everglades through existing aviation fuel pipeline</b>	Instead of using trucks to deliver fuel, use existing aviation fuel pipeline to pipe in diesel. Private entity would lease and upgrade existing tank farm facility at MIA to create this "tankering" operation. Calculations assume: 1,500 deliveries per month, 40-miles one-way by Heavy Truck	210 mt CO <sub>2</sub> e over 5 years	Calculations beyond 2015 were not available in 2010.	Avoided: 1,100 mt CO <sub>2</sub> e
<b>Water and Energy Efficiency Total Emissions Reductions:</b>		<b>574,000 mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>2.0 million mt CO<sub>2</sub>e</b>

Strong Leadership, Connections and Commitment				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emission Avoidances, Storage, or Sequestration
<b>Adopt existing draft County Ordinance (per Resolution R468-06) requiring water efficiency retrofits at point of home resale (prior to changing ownership) and later update the ordinance to require additional retrofits focusing on energy efficiency</b>	Ordinance requiring the retrofitting of homes to meet current energy code upon resale.  Calculation assumes: 7,657 homes sold each year; annual residential electricity consumption of 14,605 kWh per home; 80% of total energy use will be affected by the retrofitting; and the retrofitting will increase efficiency by 17%.	17,000 mt CO <sub>2</sub> e	Assuming a 2% increase in home sales each year from 2011 – 2050, emissions reductions are 49,000 mt CO <sub>2</sub> e	Avoided: 26,000 mt CO <sub>2</sub> e over five years
<b>Strong Leadership, Connections, and Commitment Total Emission Reductions:</b>		<b>17,000 mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>26,000 mt CO<sub>2</sub>e</b>

Water and Energy Efficiency				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Continue to implement the Water Use Efficiency Plan and the Non-Revenue Water Loss Plan initiatives to meet established reduction targets</b>	Reduce total water consumption by 1.5 MGD through efficiency and conservation. Reduce total annual apparent water losses from 16.6 billion gallons per year to 10 billion gallons per year and non-revenue water loss by 50 percent from 10.2 billion gallons per year to 5 billion gallons per year by improving implementation of the IWA/AWAA four basic methods of managing real losses.	16,000 mt CO <sub>2</sub> e	Total Program Reductions: 105,000 mt CO <sub>2</sub> e over 20 years (19.8 MGD)	Avoided : 890,000 mt CO <sub>2</sub> e over 20 years
<b>Incentivize energy efficient development</b>	Implement permitting process recommendations to increase green development. Aim to reduce energy use in residential sector for 350 retrofits and in commercial sector for 150 retrofits. Calculations assume 500 buildings per year, 70% Residential (350 bldgs) and 30% Commercial (150 bldgs); annual electricity consumption of 14,605 kWh/residential bldg and 114,247 kWh/commercial bldg; average area of 2,344 ft <sup>2</sup> per residential building and 3,266 ft <sup>2</sup> per commercial bldg;	Residential Sector: 580 mt CO <sub>2</sub> e Commercial Sector: 2,000 mt CO <sub>2</sub> e	Each additional 5 years: Residential Sector: 580 mt CO <sub>2</sub> e Commercial Sector: 1,950 mt CO <sub>2</sub> e	Avoided: Residential: 1,600 mt CO <sub>2</sub> e over 5 years; Commercial: 6,800 mt CO <sub>2</sub> e over 5 years  Additionally, 100% compliance with Energy Code will avoid 390,000 mt CO <sub>2</sub> e (assumes 5% reduction from



Our Environment				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Implement Wastewater Reuse Projects consistent with the 20-Year Water Use Permit and the Miami-Dade Water and Sewer Department Master Plans to recharge the Biscayne Aquifer</b>	Wastewater reuse is a sustainable alternative to wastewater disposal. In the past wastewater reuse has been limited in southeast Florida due to the costs of treatment and distribution relative to the low cost of providing potable water to meet the needs of residents. Shallow ground water is no longer available to meet new water supply demands, and the County has identified projects to meet about 50% of new water supply needs over the next 20 years with reclaimed wastewater.  Calculation assumes: 46,149,520 kWh increase in demand in 2014, and 170,448,014 kWh increase in demand after all phases are online in 2026.	26,000 mt CO <sub>2</sub> e increase  This increase is not included in the total reductions noted at the end of the table (19,900) since the purpose of the table is to total reductions only. However, the method of calculation is included here for documentation and replication purposes.	After all phases are on-line, the increase is estimated at  93,000 annually in comparison to current energy use. Completion of the final phase is estimated in year 2026.	The increased energy needs are significantly less than the alternative option of desalination. It is estimated that seawater desalination could use over 10x the energy as reclaimed waste water.
<b>Continue to minimize the impact of development on natural resources such as air, wetlands, Biscayne Bay and coastal habitats, natural forest communities, and trees through regulatory programs</b>	The County seeks to protect and manage the intrinsic value of the wetlands through the wetland regulatory program.  Calculation assumes 860,870 freshwater wetland acres within the County and Everglades National Park, carbon storage value of 609 metric tons per hectare, and 1.02 for accumulation through the methodology cited in the Climate Change Our Environment section.	This initiative will not result in emission reductions	This initiative will not result in emission reductions	Carbon storage in estimated existing wetlands is approximately 212 million metric tons. Annual carbon accumulation is approximately 362,000 metric tons.
<b>Continue to acquire important lands through the Environmentally Endangered Lands (EEL) program</b>	Calculations assume 22,800 EEL acres within the County and 17,538 priority lands not yet acquired.  Carbon storage and accumulation values vary based on the habitat type according to the methodology cited in the Climate Change Our Environment section.  The values are based on the habitat community types, including freshwater marsh, mangrove swamp, pinelands, tropical hardwood hammocks, mixed pine-hardwoods, and low impact urban.	This initiative will not result in emission reductions	This initiative will not result in emission reductions	Carbon storage in existing EEL acres is estimated at over 5 million metric tons. Annual carbon accumulation is estimated at over 11,000 metric tons. Storage for remaining acres to be acquired is estimated at 4 million metric tons, with annual carbon accumulation estimated at over 8,000 metric tons.
<b>Use waste as energy at the WASD South District Wastewater Treatment facility</b>	Calculation assumes: Replacing flaring 900 ft <sup>3</sup> /min with combustion at co-generation plant; combustion will produce 17.5 million kWh/yr.	440 mt CO <sub>2</sub> e	Each additional 100 cfm of biogas combusted in the co-generators can potentially reduce emissions 49 mt CO <sub>2</sub> e	Avoided: 2,200 mt CO <sub>2</sub> e
<b>Continue to increase participation in the residential recycling program</b>	Calculation assumes: 2009 recycling statistics – 36,700 tons of Mixed General Paper, 1,300 tons of aluminum, 3,800 tons of HDPE plastics, & 12,900 tons of glass – recycled; a 4% increase in 2010, and then a 2% increase in subsequent years through 2015.	20,000 mt CO <sub>2</sub> e	Continuing the program from 2016 -2050, with an assumed annual increase in tons recycled of 0.5% can potentially reduce emissions by 34,000 mt CO <sub>2</sub> e	Avoided: 64,000 CO <sub>2</sub> e
<b>Our Environment Total Emission Reductions:</b>		<b>19,900 mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>66,200 mt CO<sub>2</sub>e</b>

Responsible Land Use and Smart Transportation				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Land Use Strategies and Initiatives - Better Integrate Planning and Prioritize Investments &amp; Support Existing Communities and Value Neighborhoods</b>	A collection of indirect measures that facilitate compact development and are expected to achieve GHG emissions reductions. Calculation assumes: Baseline of 30,203 tons CO <sub>2</sub> e emitted from personal vehicle (MPO, "Emissions Scenarios" Figure 12), 5% reduction. This results in an estimated 500,000 mt CO <sub>2</sub> e reduction by 2015. The emissions reductions estimates from the following two initiatives Transit-Oriented Development and Walking and Biking initiatives were subtracted from the 500,000 because specific emissions reductions estimates have been made for those compact development strategies.	360,000 mt CO <sub>2</sub> e	Aggressive implementation of Compact Development strategies may result in emissions reductions of approximately 8 million mt CO <sub>2</sub> e	Avoided: 360,000 mt CO <sub>2</sub> e
<b>Increase transit-oriented development (TOD) that integrates transportation and affordable housing</b>	VMT reductions realized from the Santa Clara DOT were correlated to two TOD developments expected to go online by 2015 (Brownsville and Northside). Brownsville Station TOD, 467 units of affordable housing. Northside Station TOD, 350 units of affordable housing. Calculation assumes: After implementation, an 87%/99% increase in weekday/weekend ridership over current values, average trip length of 7.2 miles.	4,200 mt CO <sub>2</sub> e for Brownsville 7,800 mt CO <sub>2</sub> e for Northside.	This initiative is a subset of the Aggressive Implementation of Compact Development	Avoided: 4,200 mt CO <sub>2</sub> e for Brownsville, 7,800 mt CO <sub>2</sub> e for Northside
<b>Increase Bicycle &amp; Walking Strategy &amp; Initiatives</b>	These are a collection of initiatives expected to achieve a mode shift from the single occupancy vehicle to bicycle or walking. Calculations assume: Six percentage point increase to 16% walking/biking, data as provided by the FHWA, average trip length of 2 miles and 0.5 miles for biking and walking, respectively.	130,000 mt CO <sub>2</sub> e	This initiative is a subset of the Aggressive Implementation of Compact Development	Avoided: 130,000 mt CO <sub>2</sub> e
<b>Fund &amp; construct priority non-motorized multi-use trails</b>	Calculations assume: 860,700 VMT eliminated by Ludlam Trail (MDPR Draft Miami-Dade County Trail Benefits Study—Ludlam Trail Case Study). Length of trail is 6.2 miles for Ludlam Trail, 8.4 miles for Black Creek Trail; reduction achievements per mile for Ludlam Trail were applied to Black Creek Trail.	640 mt CO <sub>2</sub> e	This initiative is a subset of the Aggressive Implementation of Compact Development	Avoided: 2,600 mt CO <sub>2</sub> e
<b>Increase integration of transit and biking</b>	Calculations assume: 1,750 Bike and Ride permits per year, 255 workdays per year, 1 mile ride to bus station (times 2) for each boarding.	1,000 mt CO <sub>2</sub> e	Each additional 100 permits can potentially reduce emissions 57 mt CO <sub>2</sub> e	Avoided: 5,000 mt CO <sub>2</sub> e



Responsible Land Use and Smart Transportation				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Increase Transit Ridership</b>	These are a collection of service improvement initiatives that are projected to increase transit ridership by 10%. Calculations assume: Average trip length on Metro Bus, Metro Rail and Metro Mover of 4.5, 7.2, and 1.0 miles, respectively, and 2009 boardings for Metro Bus, Metro Rail, and Metro Mover of 75,608,000, 18,244,476, and 8,100,144, respectively. 10% ridership increase would be 10 million more boardings per year, based on the above boarding numbers, equating to 26,448 mt CO <sub>2</sub> e. The emissions reductions estimates from the following initiatives were subtracted from this overall shift to avoid double-counting, resulting in a net decrease of approximately 13,000 mt CO <sub>2</sub> e: Increase the number of enhanced bus corridors; Increase the number of Park and Ride facilities; Complete the Airport Link, connection of the Metrorail to Miami International Airport; and Expand the express bus service between Miami-Dade and Broward Counties through extending the I-95 managed/express lanes.	14,000 mt CO <sub>2</sub> e	Every 5% increase in transit ridership can potentially reduce emissions 13,000 mt CO <sub>2</sub> e	Avoided: 26,000 mt CO <sub>2</sub> e
<b>Increase the number of enhanced bus corridors</b>	Enhancements include traffic signal prioritization, areas along corridor with dedicated lane, shorter headways, larger capacity buses, technology improvements such as Wi-Fi, etc. Calculations assume: 3,600 additional daily boardings over the next five years, average trip length of 4.5 miles on Metro Bus.	3,300 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 13,000 mt CO <sub>2</sub> e
<b>Increase the number of Park and Ride facilities</b>	Establish six new Park & Ride Facilities. Calculation assumes: 80% of the available parking spaces are occupied 6 days per week, 52 weeks per year. Average trip length of 4.5 miles, doubled for round trips.	900 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 4,000 mt CO <sub>2</sub> e
<b>Complete the Airport Link – connection of the Metrorail to Miami International Airport</b>	Calculation assumes: 66,700 increased daily boardings, average trip length of 7.2 miles.	8,400 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 34,000 mt CO <sub>2</sub> e
<b>Expand the express bus service between Miami-Dade and Broward Counties through extending the I-95 managed/express lanes from Golden Glades Interchange to I-595</b>	Calculation assumes: 800 increased daily boardings, average trip length of 3 miles.	340 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 670 mt CO <sub>2</sub> e
<b>Work in partnership with the Metropolitan Planning Organization (MPO) and South Florida Commuter Services to expand carpooling and vanpooling programs</b>	Work in partnership the MPO and South Florida Commuter Services to expand carpooling and vanpooling programs. Calculations assume: 10,090,688 total passenger miles eliminated for Vanpool Program; 7,063,423 total passenger miles eliminated and annual increase in participation rate of 5% for Carpooling Program.	1,600 mt CO <sub>2</sub> e for Vanpool Program 3,900 mt CO <sub>2</sub> e for Carpool Program	Each additional 100 commuters switched may potentially reduce emissions 2.4 mt CO <sub>2</sub> e	Avoided: 10,000 mt CO <sub>2</sub> e for Vanpool Program 11,000 mt CO <sub>2</sub> e for Carpool Program
<b>Responsible Land Use and Smart Transportation Total Emissions Reductions:</b>		<b>532,000 mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>608,000 mt CO<sub>2</sub>e</b>

Vibrant Economy				
Initiative	Calculation Assumptions	Projected Emission Reductions: 5 Years 2011 - 2015	Projected Emission Reductions: Program Lifetime	Emissions Avoidance, Storage, or Sequestration
<b>Establish a local action plan for green industries and green jobs and examine economic challenges related to climate change</b>	Estimated percentage savings based on energy consumption reduction by businesses registered through the Miami-Dade County Tax Collector Office achieving County Green Business Certification Standards.  Calculation assumes: 102,000 local businesses, average commercial consumption of 114,247 kWh/year, 5% energy savings	326,000 mt CO <sub>2</sub> e	Calculations beyond 2015 were not available in 2010.	Avoided: 326,000 mt CO <sub>2</sub> e
<b>Vibrant Economy Total Emissions Reductions:</b>		<b>326,000 mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>326,000 mt CO<sub>2</sub>e</b>
<b>GreenPrint 2015 Total Emissions Reductions:</b>		<b>1.5 million mt CO<sub>2</sub>e</b>	<b>Avoidances:</b>	<b>3.1 million mt CO<sub>2</sub>e</b>

Additional Impact on Emissions (not a GreenPrint initiative)				
<b>CAFE Standards Calculations</b>	Calculations assume: Estimated 2010 VMT of 53,451,000 miles, an annual 0.08% reduction in VMT (based on historical data), current average fuel efficiency of 22.5 mpg, annual increase in average fuel efficiency of 1.7%	670,000 mt CO <sub>2</sub> e		Avoided: 2 million mt CO <sub>2</sub> e