

City of Tampa

Energy Efficiency and Conservation Plan

June 2011
rev. August 15, 2011

Prepared for:



City of Tampa
315 E. Kennedy Blvd.
Tampa, Florida 33602

Prepared by:

ATKINS
formerly PBS&J

4030 West Boy Scout Blvd.
Tampa, Florida 33607

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

This City of Tampa Energy Efficiency and Conservation Plan is the outcome of work contributed by a number of individuals. We wish to thank all individuals who contributed to the success of this report, in particular:

- Thomas Snelling, City of Tampa, Deputy Director of Growth Management and Development Services and City of Tampa's Green Officer
- Lorelee Morrow, Urban Designer, Land Development Coordination, City of Tampa
- Tim Perry, Fleet Manager, City of Tampa
- Greig Grotecloss, Engineer II, McKay Bay Refuse-to-Energy Facility, City of Tampa
- Frank Pfister, Maintenance and Specifications Officer, Tampa Fire Rescue, City of Tampa
- Brad L. Baird, Director, Water Department, City of Tampa
- Andrea Roshaven, Environmental Specialist I/Water Conservation Coordinator, Water Department, City of Tampa
- Jim Corbett, Parking Division Manager, City of Tampa
- David Bracciano, Demand Management Coordinator, Tampa Bay Water

CONTENTS

ACKNOWLEDGEMENTS	II
ACRONYMS	IV
EXECUTIVE SUMMARY	1
CHAPTER 1 INTRODUCTION	1-1
1.1 Purpose.....	1-2
1.2 Goals.....	1-2
1.3 Background.....	1-3
1.4 Regulatory Setting	1-4
CHAPTER 2 METHODOLOGY	2-1
2.1 Overview.....	2-2
2.2 GHG Emissions in Tampa.....	2-3
2.3 Calculation of GHGs.....	2-4
CHAPTER 3 GHG EMISSIONS INVENTORY	3-1
3.1 2009 Municipal Emissions Inventory.....	3-2
3.2 2009 Community-Wide Emissions Inventory	3-5
3.3 2025 Business as Usual Emissions Inventory.....	3-6
CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS	4-1
4.1 Existing Tampa Programs	4-2
4.2 Additional Tampa Reduction Measures	4-5
CHAPTER 5 TOTAL ESTIMATED REDUCTIONS	5-1
5.1 Reduced 2025 Emissions	5-2
5.2 Net Emissions Comparison by Year	5-3
CHAPTER 6 CONCLUSIONS	6-1
CHAPTER 7 IMPLEMENTATION	7-1
7.1 STEP 1—Administration and Staffing	7-2
7.2 STEP 2—Financing and Budgeting	7-2
7.3 STEP 3—Timeline and Prioritization	7-7
7.4 STEP 4—Public Participation	7-9
7.5 STEP 5—Green Fast Track Review	7-9
7.6 STEP 6—Monitoring and Inventorying	7-9
7.7 STEP 7—Beyond 2025	7-10

2B APPENDICES

CHAPTER 8 REFERENCES.....	8-1
APPENDIX A: THE GREENHOUSE EFFECT, GREENHOUSE GASES, AND CLIMATE CHANGE IMPACTS	8-1
APPENDIX B: MODELING COEFFICIENTS AND DATA ASSUMPTIONS	8-2
APPENDIX C: COMMUNITY-WIDE DATA INPUTS.....	8-3
APPENDIX D: MUNICIPAL INVENTORY GHG CALCULATIONS	8-4
APPENDIX E: COMMUNITY-WIDE INVENTORY GHG CALCULATIONS	8-5
APPENDIX F: REDUCTION MEASURES, ASSUMPTIONS AND ATTRIBUTED REDUCTIONS.....	8-6

APPENDICES

Appendix A:	The Greenhouse Effect, Greenhouse Gases, and Climate Change Impacts
Appendix B:	Modeling Coefficients and Data Assumptions
Appendix C:	Community-Wide Data Inputs
Appendix D:	Municipal Inventory GHG Calculations
Appendix E:	Community-Wide Inventory GHG Calculations
Appendix F:	Reduction Measures, Assumptions and Attributed Reductions

TABLES

Table ES-1	Net Total 2025 Emissions Comparison	2
Table 3-1	2009 Total Municipal Emissions	3-2
Table 3-2	2009 Municipal Emissions by Department.....	3-3
Table 3-3	Estimated Municipal Energy Costs	3-4
Table 3-4	2009 Community-Wide Net Total Emissions.....	3-5
Table 3-5	2009 Community-Wide Cost Estimates	3-6
Table 3-6	2025 Reduction Target	3-6
Table 3-7	2025 Community-Wide BAU Net Total Emissions	3-7
Table 3-8	Net Total Emissions by Year	3-8
Table 4-1	GHG Emissions Reduced and Cost Savings	4-16
Table 5-1	Reduced 2025 Net Total Emissions	5-2
Table 5-13	Net Total 2025 Emissions Comparison	5-3
Table 7-1	GHG Reduction Measure Timeline and Phasing Schedule	7-8

FIGURES

Figure 3-1 2009 Municipal Emissions by Source (metric tons CO₂e).....3-3

Figure 3-2 2009 Municipal Emissions by Department (metric tons CO₂e)3-4

Figure 3-3 2009 Emissions Generated by Source (metric tons CO₂e).....3-5

Figure 3-4 2025 Community-Wide BAU Emissions by Source (metric tons CO₂e)3-7

Figure 5-1 Reduced 2025 Emissions by Emissions Category (metric tons CO₂e).....5-3

Figure 6-1 Total Emissions by Year (metric tons CO₂e)6-2

ACRONYMS

ADWF	Average Daily Wastewater Flow
ARRA	American Recovery & Reinvestment Act
BAU	Business as usual
BACT	Best Available Control Technology
BOD	Biochemical oxygen demand
BTU	British thermal unit
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CCTP	Climate Change Technology Program
CFC	Chlorofluorocarbons
C ₂ F ₆	Hexafluoroethane
CF ₄	Carbon Tetrafluoride
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
COT	City of Tampa
CREB	Clean Renewable Energy Bonds
CSD	Community Services District
DEP	Department of Environmental Protection
DPM	Diesel Particulate Matter
EECGB	Energy Efficiency Community Block Grant
eGRID	Emissions and Generation Resource Integrated Database
EISA	Energy Independence and Security Act of 2007
ESCO	Energy Service Company
FGBC	Florida Green Building Council
FSC	Forest Stewardship Council
GCC	Global Climate Change
GHG	Greenhouse Gas
GMDS	Growth Management and Development Services
GWh	Gigawatt Hours
GWP	Global Warming Potential
HB	House Bill
HFC	Hydrofluorocarbons
HFC-23	Trifluoromethane
HFC-134	Hydrofluorocarbon 134
HFC-152a	Difluoroethane

HOV	High Occupancy Vehicle
IPCC	Intergovernmental Panel on Climate Change
ITS	Intelligent Transportation Systems
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LGOP	Local Government Operations Protocol
L RTP	Long Range Transportation Plan
MMBTU	Million BTUs
MMT	Million Metric Tons
MMT CO ₂ e	Million Metric Tons Carbon Dioxide Equivalent
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MT	Metric Tons
MT CO ₂ e	Metric Tons Carbon Dioxide Equivalent
MWh	Megawatt hours
MWh/year	Megawatt hours per year
MY	Model Year
N ₂ O	Nitrous Oxide
NHTSA	National Highway Traffic Safety Administration
O ₃	Ozone
PACE	Property Assessed Clean Energy
PFC	Tetrafluoromethane
PSC	Public Service Commission
PSD	Prevention of Significant Deterioration
SIP	State Implementation Plan
SF ₆	Sulfur Hexafluoride
STIP	State Transportation Improvement Plan
TBARTA	Tampa Bay Area Regional Transportation Authority
TBW	Tampa Bay Water
TCEA	Transportation Concurrency Exception Area
TCR	The Climate Registry
TECO	Tampa Electric Company
tpy	Tons per year
EECP	Tampa Energy Efficiency and Conservation Plan
TWD	Tampa Water Department
ULEV	Ultra Low Emissions Vehicle
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS 2007	Urban Emissions Model, version 9.2 published in June 2007
USEPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled

EXECUTIVE SUMMARY

The City of Tampa is committed to providing a more livable, equitable, and economically vibrant community through the incorporation of sustainability features and reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power our buildings, recycling our waste, conserving water, and enhancing access to sustainable transportation modes, Tampa will keep dollars in our local economy, create new green jobs, increase energy independence, and improve community quality of life. These efforts toward reducing GHG emissions described in this report must be done in coordination with the City's land use decisions. The foundation of planning land use decisions is found in the Comprehensive Plan policies and programs.

Through this Energy Efficiency and Conservation Plan, Tampa has established goals and policies for the year 2025 that continue to incorporate efficient use of resources into its daily management of residential, commercial and industrial growth, education, energy and water use, air quality, transportation, waste reduction, economic development, and open space and natural habitats to further their commitment.

The first step in completing the Tampa Energy Efficiency and Conservation Plan was to inventory the City's GHG emissions. Two annual inventories for the year 2009 are included in this report: one representing the community-wide emissions and the other representing only emissions from the City government's municipal operations. Sources of emissions include transportation, electricity and natural gas use, landscaping, water and wastewater pumping and treatment, and treatment and decomposition of solid waste. Tampa's inventories amounted to 8,972,139 metric tons of CO₂e community-wide and 246,087 metric tons of CO₂e from municipal operations.

Following the state's adopted GHG reduction target, Tampa has set a goal to reduce emissions back to 1990 levels by the year 2025. The projected business-as-usual emissions for the year 2025, based on population and housing growth estimates, are 11,830,892 metric tons of CO₂e. In order to reach the reduction target, Tampa must offset this growth in emissions and reduce community-wide emissions to 7,777,281 metric tons CO₂e by the year 2025.

The City of Tampa has already demonstrated its commitment to sustainability through a variety of programs and policies. These programs include the Tampa Green Resolution, EECBG-funded energy upgrade projects, collaboration with TECO Energy, Tampa Green Fast Track Review, and Tampa's Water Conservation Program.

Various state and federal policies have enacted programs that will also contribute to reduced GHG emission in Tampa by the year 2025. Some of these policies are: updated building codes for energy efficiency, statewide recycling goals, renewable fuel standard, and federal CAFE standards for vehicles. By supporting the state in the implementation of these measures, Tampa will experience substantial emissions reductions.

In order to reach the reduction target laid out in this Energy Efficiency and Conservation Plan, Tampa needs to implement the additional reduction measures described in this report by the year 2025. These

6B EXECUTIVE SUMMARY

measures encourage energy efficient retrofits, transportation oriented planning, water conservation, increased efficiency of the waste-to-energy process, and use of low emission landscaping equipment. Table ES-1, below, summarizes the community wide emissions for 2009, 2025 business-as-usual (BAU), and the reduced 2025 inventory with the inclusion of the reduction measures.

Table ES-1 Net Total 2025 Emissions Comparison				
Source Category	Metric tons of CO₂e			% Reduced from BAU
	2009	BAU 2025	Reduced 2025	
Transportation	4,396,028	6,101,312	4,184,739	31.5%
Energy	4,191,885	5,248,340	3,221,160	38.6%
Area Sources	132,272	161,870	117,077	27.7%
Water and Wastewater	91,031	113,263	91,031	19.6%
Solid Waste	160,923	200,107	154,438	22.8%
Total	8,972,139	11,830,892	7,768,444	34.3%
2025 Emission Reduction Target	-	7,777,281	7,777,281	-
Note: Mass emissions of CO ₂ e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.				

In addition to the emission reductions, this plan describes the cost savings associated with each of the reduction measures. The financing opportunities and strategies for implementing the reduction measures are described in Chapter 7.

Tampa has elected to be a green and sustainable community. To accomplish this, Tampa’s community of residents, neighbors, workers, and visitors strive together to balance ecological, economic, and social needs to ensure a clean, healthy and safe environment for all current members of society and for generations to come.

CHAPTER 1 Introduction

The City of Tampa is committed to providing a more livable, sustainable, and economically vibrant community through the preservation of natural resources and reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, and enhancing access to sustainable transportation modes, Tampa will keep dollars in the local economy, create new green jobs and improve community quality of life. These efforts toward reducing GHG emissions must be done in coordination with the City's land use decisions. The foundation of planning land use decisions is found in the Comprehensive Plan policies and programs. The Tampa Energy Efficiency and Conservation Plan (EECP) considers the Comprehensive Plan policies and programs as the GHG emissions are inventoried and reduction strategies are recommended.

This section describes the purpose and goals of the EECP, provides background information on GHG emissions, and summarizes the regulatory framework surrounding GHG emissions and climate change.

1.1 Purpose

The EECP was designed under the premise that the City and the community it represents are uniquely capable of addressing both emissions from the City's municipal operations as well as community-wide emissions from sources under the City's jurisdiction. The City's emission reduction efforts should coordinate with the state strategies in order to accomplish emission reductions in an efficient and cost effective manner. The City developed this document with the following purposes in mind:

- Create a GHG baseline of both municipal emissions and community-wide emissions from which to benchmark GHG reductions
- Provide a plan that is consistent with and complementary to the GHG emissions reduction efforts being conducted by the Florida Department of Environmental Protection (DEP), the federal government through the actions of the Environmental Protection Agency (EPA), and the global community through the Kyoto Protocol
- Guide the development, enhancement, and implementation of actions that reduce GHG emissions and promote economic and environmental sustainability
- Provide a policy document with specific implementation measures meant to be considered as part of the planning process for future development projects

1.2 Goals

To fulfill the purposes of the EECP, the City identified the following goals to be achieved:

- Provide a list of specific actions that will reduce GHG emissions, giving the highest priority to actions that provide the greatest reduction in GHG emissions and benefits to the community at the least cost

- Reduce community-wide emissions attributable to Tampa to levels at or below 1990 GHG emissions by year 2025

1.3 Background

The EECF achieves the purpose and goals described above by providing:

- An analysis of GHG emissions and sources attributable to the City of Tampa.
- Estimates on how those emissions are expected to increase.
- Recommended policies and actions that can reduce GHG emissions to meet state, federal and international targets.
- A timeline of implementation.
- A defined tracking and reporting mechanism that will measure progress toward the goals.

In order to understand this process, the reader needs to know a few facts about GHG emissions, the climate change impacts anticipated within the City of Tampa, and the international, federal, state, and regional regulatory framework designed to address climate change. The following information provides a brief background on these topics. A more complete description of the greenhouse effect, GHG emissions, and general climate change impacts can be found in Appendix A of this document.

Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating "blanket" of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. This blanket is a collection of atmospheric gases called greenhouse gases, based on the idea that these gases also trap heat similar to the glass walls of a greenhouse. These gases, consisting mainly of water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and chlorofluorocarbons (CFC), all act as effective global insulators, reflecting back to earth infrared radiation. EPA has identified sources of GHG emissions from activities such as producing electricity and driving internal combustion vehicles.

Tampa does not generate significant emissions of CFCs (primarily used as refrigerants, aerosol propellants, and cleaning solvents) due to the successful global bans on these GHGs. This also includes other synthesized gases such as hydrofluorocarbons (HFC) and carbon tetrafluoride (CF₄), which have been banned and are no longer available on the market. Because of the ban, the City will not generate emissions of these GHGs and, therefore, they are not considered further in this document.

Another GHG is sulfur hexafluoride (SF₆), which is mainly used as a gaseous dielectric medium in electric switchgear of high-voltage electric transmission lines, and for medical use in retinal detachment surgery and ultrasound imaging. However, in both uses, SF₆ is not released to the atmosphere and, therefore, it is not considered further in this document.

Because GHGs have variable potencies, a common metric of carbon dioxide equivalents (CO₂e) is used to report the combined potency from all of the GHGs. The potency each GHG has in the atmosphere is measured as a combination of the volume of its emissions and its global warming potential (GWP),¹ and is expressed as a function of the potency with respect to the same mass of CO₂. Thus, by multiplying the individual gas by its global warming potential, the emissions of each individual gas can be measured in terms of metric tons of CO₂e (MT CO₂e). For example, methane has a GWP of 21, meaning it is 21 times more effective at trapping heat as CO₂. One metric ton of methane is equal to 21 metric tons of CO₂e.

1.4 Regulatory Setting

In an effort to stabilize GHG emissions and reduce impacts associated with climate change, international agreements as well as federal and state actions were implemented beginning as early as 1988. The international, federal, state, regional, and local government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

International and Federal



KYOTO PROTOCOL

The United States participated in the United Nations Framework Convention on Climate Change (UNFCCC) signed on March 21, 1994. The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012 (UNFCCC 1997). It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol’s commitments.

In anticipation of providing an updated international treaty for the reduction of GHG emissions, representatives from 170 countries met in Copenhagen in December 2009 to ratify an updated UNFCCC agreement (Copenhagen Accord). The Copenhagen Accord, a voluntary agreement between the United

¹ The potential of a gas or aerosol to trap heat in the atmosphere.

States, China, India, and Brazil, recognizes the need to keep global temperature rise to below 2 °C and obliges signatories to establish measures to reduce greenhouse gas emissions and prepare to help poorer countries in adapting to climate change. The countries met again in Cancun in December 2010 and adopted the Cancun Agreements, which reinforces and builds upon the Copenhagen Accord. The nations agreed to recognize country targets, develop low-carbon development plans and strategies, and report inventories annually. In addition, agreements were made regarding financing for developing countries and technology support and coordination among all nations. The next conference of the parties is scheduled for December 2011 in South Africa.

CLIMATE CHANGE TECHNOLOGY PROGRAM

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The EPA is responsible for implementing federal policy to address global climate change. The federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the United States. These programs focus on energy efficiency, renewable energy, methane, and other non-CO₂ gases, agricultural practices, and implementation of technologies to achieve GHG reductions. EPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions. Programs include the State Climate and Energy Partner Network that allows for the exchange of information between federal and state agencies regarding climate and energy, the Climate Leaders program for companies, the Energy Star labeling system for energy-efficient products, and the Green Power Partnership for organizations interested in buying green power. All of these programs play a significant role in encouraging voluntary reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors.

State

EXECUTIVE ORDERS OF 2007

In July 2007, Governor Charlie Crist issued three Executive Orders that outlined Florida's commitment to addressing climate change.

- Executive Order 07-126 directed state government to “lead by example” by quantifying operational emissions and meeting specific reduction targets by implementing a range of GHG emission reduction efforts.
- Executive Order 07-127 set emission reduction targets for the state as follow: by 2017, reduce GHG emissions to 2000 levels; by 2025, reduce GHG emissions to 1990 level; and by 2050, reduce GHG emissions by 80% of 1990 levels. The Order also assigned tasks to the Florida Department of

Environmental Protection (DEP) and the Florida Public Service Commission (PSC) to work toward adopting rules and regulations to achieve the reduction targets.

- Executive Order 07-128 instigated the formation of the Florida Climate Action Team whose main objective was to create a comprehensive Energy and Climate Change Action Plan for the state of Florida to achieve the state reduction target.

ENERGY, CLIMATE CHANGE, AND ECONOMIC SECURITY ACT OF 2008

The Energy, Climate Change, and Economic Security Act (House Bill 7135), passed in 2008, amended several sections of the Florida Statutes to enact climate change and greenhouse gas reduction initiatives and policies. Policies include the Florida Climate Protection Act, which authorizes the Department of Environmental Protection to develop an electric-utility GHG cap-and-trade program. The bill also directs the Public Service Commission to adopt a Renewable Portfolio Standards for public utilities and establishes the Florida Energy and Climate Commission, which will execute many of the statute's provisions. The Florida Energy Systems Consortium was established as a collaboration of the state universities and tasked to develop and implement a strategic plan for the state. The bill also sets a statewide 10-percent ethanol Renewable Fuel Standard, increases energy efficiency targets in the Florida Building Code by 50 percent by 2019, and mandates that all state-financed building construction and renovation comply with green building standards. The bill also amended Section 339.175 of the Florida Statutes by stating, "Each MPO is encouraged to consider strategies that integrate transportation and land use planning to provide for sustainable development and reduce greenhouse gas emissions."

FLORIDA ENERGY AND CLIMATE CHANGE ACTION PLAN

The final Energy and Climate Change Action Plan, finished in 2008, provides 50 separate policy recommendations that will reduce harmful GHG emissions and provide a framework for climate change adaptation strategies for the state. The Plan acknowledges Florida's unique susceptibility to impacts of climate change and encourages early actions toward energy conservation, energy efficiency, investments in low-carbon energy sources, and market-oriented regulations to reduce GHG emissions.

The plan revealed that "in 2005, Florida's gross emissions accounted for approximately 337 million metric tons of carbon dioxide equivalent, this was a growth of 35 percent from 1990 to 2005 (roughly twice the national average of 16 percent), driven largely by the growth of population and emissions associated with economic development." Emissions are also projected to rise steeply to about 463 million metric tons by 2025 (86 percent above 1990 levels) without the incorporation of actions to control emissions. (CCS 2008a)

The Action Plan policy recommendations include a 20% by 2020 Renewable Portfolio Standard, increased energy efficiency in buildings, forest restoration and management, increased municipal solid waste technology, development and expansion of low-GHG fuels, improved transportation management, and transportation and land use planning policies among others. Florida is considered especially susceptible to the impacts of climate change due to its low sea level, miles of coastline, and delicate wildlife habitat. Strategies to adapt include addressing the following elements: protection of ecosystems and biodiversity, water resource management, flood protection, emergency preparedness,

human health considerations, social effects, state funding and financing, and public education and outreach. (CCS 2008a)

ENERGY EFFICIENT LAND USE, ENERGY CONSERVATION, AND REDUCTION OF GREENHOUSE GASES, 2008

House Bill 697 (HB 697), signed by the Governor on June 17, 2008, made amendments to the Growth Management Act which now requires several of the mandatory local comprehensive plan elements to address greenhouse gas reduction and energy conservation. The following elements must now consider greenhouse gas reduction strategies:

- Future Land Use Element
- Traffic Circulation Element
- Transportation Element
- Conservation Element
- Housing Element

Efforts are currently being made at the state level to develop minimum criteria for compliance with HB 697.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Following Executive Order 07-127, the Florida Department of Environmental Protection (DEP) adopted three rules addressing GHG emissions reduction.

- Rule 62-285.400 Adopts California Motor Vehicle Emission Standards
- Rule 62-285.420 is the Heavy-Duty Vehicle Idling Reduction Rule
- Rule 62-285.421 initiates the Clean Diesel Rebate Program

The US EPA granted California their waiver request to regulate GHG emissions from motor vehicles under the Clean Air Act. Other states can either follow the federal standards or choose to adopt California's emissions standards for passenger vehicles. Although the Florida DEP has adopted Rule 62-285.400, the Florida legislature has not yet ratified the California Motor Vehicle Standards. The Heavy Duty Vehicle Idling Reduction Rule sets a limit of 5 consecutive minutes for a heavy-duty vehicle to be stopped with its engine running. Florida's Clean Diesel Rebate Program allowed rebates in the amount of \$1,500 per qualifying vehicle to equip the vehicle with an auxiliary power unit. Applications were accepted beginning March 15, 2009 and 55 rebates were issued during the first year; rebates are currently available through June 30, 2011.

PROPERTY ASSESSED CLEAN ENERGY, 2010

HB 7179, passed in 2010, created a financing mechanism for energy improvements that is often referred to as Property Assessed Clean Energy (PACE). Specifically, the legislation authorizes a property owner to voluntarily enter into a financing agreement with a local government for the purpose of providing financing for qualifying improvements to residential, commercial, or industrial property. Under the program, property owners can elect to invest in energy efficiency retrofits or renewable energy, and the

local government will then issue bonds or other lawful debt and pay for those improvements to an owners' property. The local government will then be paid back by the property owners through non-ad valorem assessments on participating property owners' tax bills.

Regional

HILLSBOROUGH COUNTY METROPOLITAN PLANNING ORGANIZATION

The City of Tampa is located within the geographical jurisdiction of the Hillsborough County Metropolitan Planning Organization (MPO). MPOs are responsible for maintaining and updating regional transportation plans and will play a vital role in planning transportation policies for addressing climate change. In Hillsborough County, the MPO completed a 2035 Long Range Transportation Plan (LRTP) in April 2009. The LRTP includes a report on Sustainability and GHG Reduction Strategies which explains the prominence of GHG emissions from transportation and the approach the MPO will take to reduce those emissions.

The LRTP describes how the integration of transportation and land use planning efforts are critical for reducing vehicles miles traveled (VMT) and hence, GHG emissions. Some strategies highlighted by the MPO to reduce emissions include: pricing signals through tolling, fuel prices, fuel efficiency, and parking costs; alternate mode infrastructure through highway operation, transit, carpool/vanpool, and bike/pedestrian infrastructure; land use through concurrency initiatives, density, mix of uses, and design; and transportation conservation programs such as incentives to drive less, demand management, and education.

This page intentionally left blank.

CHAPTER 2 **Methodology**

2.1 Overview

The methodology to prepare the GHG inventories in the EECP incorporates the protocols, methods and emission factors found in The Climate Registry (TCR) General Reporting Protocol and the Local Government Operations Protocol (LGOP). The LGOP categorizes GHG emissions into three distinct scopes that provide a way of organizing the EECP's development.

Definition of Local Government Protocol:

- Scope 1 Emissions includes all “direct” sources of community-wide GHG emissions from sources within the jurisdictional boundaries of the City. This includes fuel burned onsite in buildings and equipment such as natural gas or diesel fuel; transportation fuels burned in motor vehicles and airplanes; and wood-burning emissions from household hearths. For inventories of only municipal operations, these emissions are limited to activities under the operational control of the local government.
- Scope 2 Emissions account for “indirect” sources of GHG emissions resulting from the consumption of purchased electricity that is electricity used by the residents, businesses, and City's facilities. These emissions are “indirect” as the GHG emissions arise distantly, for example at an electric generating station in another city, county, or even state. Thus they are distinguished from *direct* emissions (i.e., Scope 1 emissions), which are reported by the utility itself, in order to avoid double counting.
- Scope 3 Emissions is considered an optional reporting category that encompasses all other “indirect emissions” that are a consequence of activities of the City's residents and businesses, but occur from sources out of the jurisdictional control of the local government. For example, emissions from trucks hauling waste under a City contract. The inventory will include this category if the emissions are “indirect or embodied emissions over which the local government exerts significant control or influence.”

Scope 1 emissions are characterized in this report as “direct emissions” While Scope 2 emissions are characterized as “indirect source emissions.” The Scope 3 emissions are only included in the government operations inventory for the City, these include emissions from government employees' commutes.

The analysis relative to the EECP employs both quantitative and qualitative components. The quantitative analysis contains an inventory of the City's GHG emissions, while the qualitative component involves compliance with the emission reduction strategies contained in federal, state, and local legislation. The analysis is tailored to include all historic, existing, and projected emission sources within the City while providing, to the fullest extent feasible, a comprehensive analysis of GHG impacts and mitigation measures available to reduce impacts.

2.2 GHG Emissions in Tampa



This EECF includes both an inventory of Tampa’s municipal operations and an inventory of community-wide emissions in the City’s jurisdiction. The municipal inventory categorizes the major sources and quantities of GHG emissions produced by the City’s energy and fuel use in city-owned or operated buildings, facilities, and vehicles. The City’s municipal emissions are also tabulated for each government department. The community-wide inventory identifies and categorizes the major sources and quantities of GHG emissions currently being produced by the City’s residents, businesses and municipal operations. The EECF established 2009 as the year on which to base the existing inventories; this is the most recent year for which reliable data is available. Both inventories are presented in this report for the year 2009; additionally, the community-wide emissions are forecasted to 2025 in order to establish a business-as-usual (BAU) scenario for Tampa’s future emissions. These inventories provide a framework on which to design programs and actions that specifically target reductions by emissions sources. The inventories also serve as references against which to measure the City’s progress towards reducing GHG emissions over time, and documentation for potential emission trading opportunities. Regional GHG trading programs already exist in the U.S. and a national cap-and-trade program could be implemented in the future. The inventories included in this report will serve as a basis for Tampa to participate in a regional or national carbon trading program.

Following the state’s reduction target laid out in Executive Order 07-127, the EECF establishes a return to 1990 emissions levels by 2025 as the reduction target for community-wide emissions. Due to a lack of sufficient fuel use and transportation data from 1990, Tampa’s 1990 emissions were estimated based on the population change over the time period from 1990 to 2009; this value is also referred to as the reduction target throughout this report. Finally, the EECF estimates the anticipated community-wide emissions for 2025 based on expected growth in population and employment.

In estimating Tampa’s total greenhouse gas emissions, data sources from the City, regional, and state agencies were used. In cases where specific data for 2009 was not available, estimates were made by extrapolating from data available. General estimate calculations and assumptions are compiled in Appendices B through F. All of the contributors to greenhouse gas emissions (kilowatt-hours of electricity generated by fossil fuel combustion in power plants, natural gas in therms, vehicle travel in vehicle miles traveled, and solid waste in tons) are expressed in the common unit of metric tons of carbon dioxide equivalent (MT CO₂e) released into the atmosphere in a given year.

Tampa’s main contribution to GHGs is carbon dioxide (CO₂). The City directly generates emissions of CO₂ primarily in the form of vehicle exhaust and consumption of natural gas for heating. Tampa also generates methane (CH₄) and nitrous oxide (N₂O) emissions. Methane is directly generated from natural gas and petroleum systems and wastewater treatment while nitrous oxide results predominantly from motor vehicle use.

2.3 Calculation of GHGs

The following summarizes the basis of the GHG calculations by emission source. The emissions calculations follow The Climate Registry (TCR) General Reporting Protocol and the Local Government Operations Protocol; these protocols are consistent with the methodology and emission factors endorsed by EPA. In cases where these protocols do not contain specific source emission factors, current industry standards or the US EPA's AP 42 Compilation of Air Pollution Emission Factors were used. Equations and coefficients used in the calculations of GHG's are included in Appendix B and the community-wide data inputs for the inventories are included in Appendix C. Appendices D and E contain the inventory calculations for the municipal and community-wide inventories, respectively.



GHG emissions are typically segregated into direct and indirect sources as discussed above. However, direct and indirect sources are not completely independent of each other and are often combined into other more encompassing categories. For example, although natural gas combustion is a direct source and electricity generation is an indirect source, they both are typically discussed under a heading of “Energy” when policies are put in place to reduce emissions. Therefore, this EECPP discusses community-wide emissions with respect to the general source categories of Transportation, Energy, Area Source, Water, and Solid Waste. The municipal operations are reported in the categories of electricity, natural gas, vehicle fleet, employee commute, wastewater, and waste-to-energy.

In this EECPP, BAU refers to continued operations and development of the City without the inclusion of recently-adopted or proposed sustainability initiatives. The BAU scenario describes how emissions would be in year 2025, if the emissions continued to grow strictly based upon the population and employment growth projections for the City and the naturally occurring events that might change the character of emissions. Therefore, BAU follows a predominantly linear growth pattern.

In addition to emissions, where possible, the total costs were calculated for each sector. The costs were based on the consumer fees for each fuel type included in the inventory. By including the costs, the City of Tampa is able to see where consumers and local government departments are spending the most money and utilize the information in making decisions on reduction measures.

Energy

ELECTRICITY

The City emits CO₂, CH₄, and N₂O indirectly through the use of electricity provided by Tampa Electric Company (TECO). For the municipal inventory, electricity use in government facilities and streetlights was obtained from the City and categorized by department. The City also operates McKay Bay Refuse-to-Energy facility. The energy produced by the facility is used in-house, and excess energy is sold back to

the grid. 2009 community-wide energy use was obtained from TECO, and 2025 BAU electricity use was estimated based on anticipated growth in population and employment for the City.

TECO provides electricity from a variety of sources including natural gas, oil, and coal. Each of these sources of electricity emits different levels of GHGs. The annual usage in megawatt hours per year (MWh/year) was multiplied by the emission factors, obtained from EPA's Emissions and Generation Resource Integrated Database (eGRID), appropriate to the inventory year for CO₂, CH₄, and N₂O to determine emissions from these sources. Costs of electricity calculations were based on the annual kWh use and price per kWh for each rate class. Electricity rates fluctuate throughout the year, so average values were used.

NATURAL GAS COMBUSTION

The City emits GHGs from the combustion of natural gas. The annual natural gas usage for the City in therms was converted to million British Thermal Units (MMBTUs) and multiplied by the respective emissions factors for CO₂, CH₄, and N₂O to determine the emissions from natural gas combustion, typically used for heating. Natural gas usage for both municipal and community-wide activities for 2009 was obtained from Peoples Gas Company. Anticipated 2025 natural gas data was based on per unit usage in 2009 and the anticipated unit growth by 2025. The costs associated with natural gas use were calculated using the People Gas rate schedule.

Water

WATER USE

Electricity is needed to move and treat water. Tampa produces more than 26 billion gallons of drinking water annually to meet Tampa's drinking water needs. Raw water is obtained through the Hillsborough River Reservoir, and then the water is treated at the David L. Tippin Water Treatment Facility before being pumped through the 2,230 miles of pipe to distribute the water to the residents and businesses of Tampa. The emissions associated with the electricity used to pump and treat the local water are included in the electricity sections of both the community-wide and municipal inventories described above; the electricity data received from TECO includes this electricity.

When the reservoir is low, raw water is purchased from Tampa Bay Water (TBW) to replenish it; this water is pumped from the Harney Canal to the Hillsborough River. Additionally, the Tampa Water Department (TWD) purchases treated water from TBW via the connection at Morris Bridge. TBW water is made up of a combination of groundwater, river water, and desalinated seawater. There is additional electricity consumed outside the city boundaries and GHG emissions associated with this purchased water, particularly the desalinated water, which is not accounted for in the community-wide electricity consumption data for the City of Tampa provided from TECO. The Water section of the community-wide inventory includes the emissions from the additional electricity used to pump the purchased water from TBW to into TWD's system. TWD provided data for the total gallons of water purchased from TBW during the year 2009 and emission coefficients for CO₂, CH₄, and N₂O were obtained from TBW's GHG Emissions Associated with Water Production Report presented in their Compilation of Members' Five Year Conservation Plans (TBW 2011).

WASTEWATER TREATMENT

All of the wastewater discharged to the City of Tampa system is treated in the Howard F. Curren Advanced Wastewater Treatment Plant. The final product, or effluent water, is discharged to Hillsborough Bay or used as reclaimed water for cooling and irrigation. GHG emissions arise from the electricity used to pump and treat the effluent, the transportation fuel used to truck the biosolids to an off-site disposal area, and the direct methane emissions from the anaerobic digesters used in the treatment process. The electricity and transportation emissions are included in their respective categories. The emissions presented here are the direct emissions calculated based on the amount of methane gas produced by the anaerobic digester and the amount of biochemical oxygen demand (BOD) removed from the water.

Solid Waste Management

Most of the municipal solid waste from the City's residents and businesses is converted into electrical energy at the McKay Bay Refuse-to-Energy Facility. A small portion of the City's waste is transported to the Southeast County Landfill. In the northern part of the City, the New Tampa Area has waste management services provided by the County; this waste is converted to electrical energy as well at the County's waste-to-energy facility. Emissions from the refuse to energy facility are determined by the annual tons of waste converted and the composition of the waste, which is a combination of fossil fuel and non-fossil fuel derived waste. Waste derived from fossil fuel includes petroleum products, plastics, etc. Non-fossil fuel waste is biogenic waste, derived from naturally occurring biomaterial. Emissions included in the inventory include CO₂, CH₄, and N₂O from the fossil fuel derived waste, and only CH₄ and N₂O from the non-fossil fuel derived waste. CO₂ from biogenic waste can be reported, but it is not included in the inventory because the CO₂ would naturally release into the atmosphere as the material decomposes; there is no additional CO₂ injected into the atmosphere through the burning process.

Emissions from landfilled solid waste are determined as the sum of emissions generated by transportation from its source to the landfill, the equipment used in its disposal at the landfill, and fugitive emissions from decomposition in landfills. The City of Tampa does not own a landfill, so the emissions included in this inventory are only from the transportation and decomposition of the waste; the emissions from on-site equipment are out of the control of the City. The transportation emissions are included in the transportation section discussed above.

Fugitive emissions of methane from the decomposition of solid waste are calculated based on the annual waste generation multiplied by the EPA emission factor for waste production for CH₄. The emission factor to determine CH₄ generation varies if the landfill operations are known to operate a methane flare or to generate electricity from methane capture. Carbon dioxide generated by decomposition of waste in landfills is not considered anthropogenic because it would be produced through the natural decomposition process regardless of its disposition in the landfill. Nitrous Oxide is not a bi-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated from this source.

Area Source Emissions

LANDSCAPING

Emissions of CO₂, CH₄, and N₂O are generated by the use of landscape equipment through the combustion of gasoline. CO₂ emissions were determined directly through URBEMIS2007 for the existing and 2025 inventories. URBEMIS2007 is a computer software package that is used for modeling projected emissions of air quality pollutants including carbon dioxide. From the CO₂ emissions, the approximate number of gallons of gasoline consumed through landscape equipment use was calculated. This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1 to determine both CH₄ and N₂O emissions.

Transportation

ON-ROAD VEHICLES

For Tampa's municipal inventory, CO₂, CH₄, and N₂O emissions from the City's municipal fleet were calculated based on the fuel use and annual miles traveled by each vehicle owned by the City. CO₂ emissions were calculated using the total fuel use multiplied by the emission factor for either gasoline or diesel fuel. CH₄ and N₂O emissions are based on the vehicle's age, model, and miles traveled. The emissions were then organized by department.

The municipal inventory also includes emissions from vehicles driven by employees during their commutes to and from work at the City. The employee commute patterns were gathered from a survey of employees; then, based on the response rate, the responses were extrapolated to estimate emissions for all City employees. The emissions of CO₂, CH₄, and N₂O were calculated similarly to the municipal vehicle fleet described above.

Tampa's community-wide emissions from transportation were based on the total vehicle miles traveled (VMT). VMT for the City of Tampa was estimated based on VMT reported for Hillsborough County in the Hillsborough County MPO's Long Range Transportation Plan (LRTP) (Hillsborough MPO 2009). The County VMT was proportioned to the City using an estimate of the percentage of Tampa lane-miles in the County. The total VMT was then multiplied by the emissions coefficient from the LRTP. This emissions coefficient was calculated based on meteorological and traffic characteristics specific to the Hillsborough area through EPA's MOVES (Motor Vehicle Emission Simulator) model.

The estimates do not account for electrical, biodiesel (a blend of diesel and vegetable oil), or hydrogen powered systems. Any electrically powered vehicle which draws power from a residence, commercial or industrial land use will be accounted for in the electrical usage for the City. The County also predicted VMT for 2035; under the assumption that the annual growth rate in VMT for the County is the same as Tampa's, this growth rate was used to predict 2025 VMT in the City of Tampa. Costs associated with transportation were based on the diesel and gasoline fuel use and their associated per gallon costs in 2009.

This page intentionally left blank.

CHAPTER 3 **GHG Emissions Inventory**

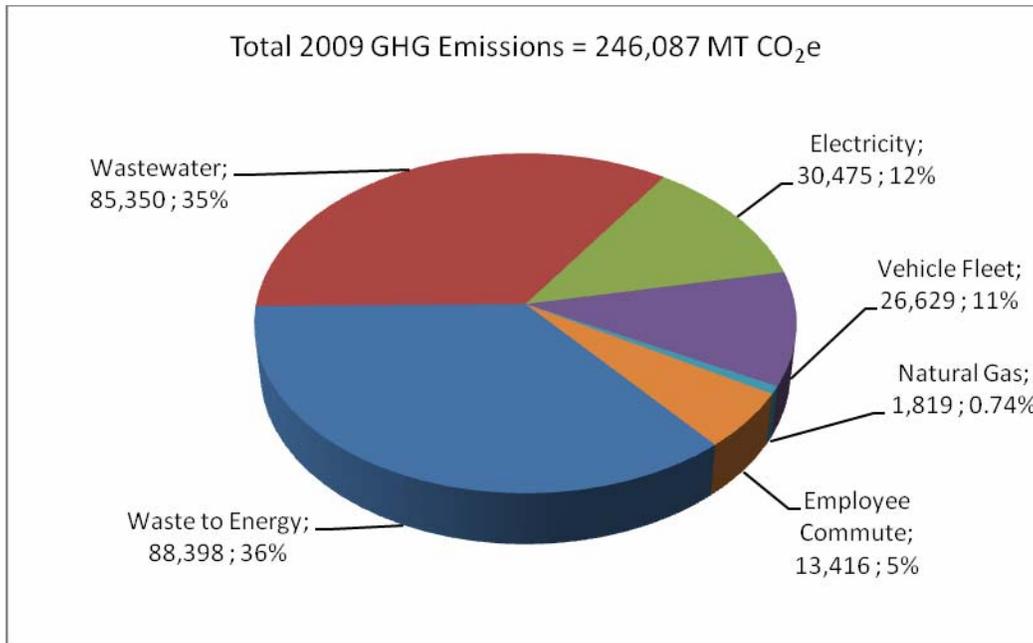
The following sections present Tampa’s municipal operations inventory and community-wide inventory. The municipal operations inventory includes sources and quantities of GHG emissions from government owned or rented buildings, facilities, vehicles, and equipment. By having the municipal emissions separated from the community as a whole, the City of Tampa local government can implement reduction strategies in its own operations, where it has direct control; closely monitor the changes in emissions over time; and set an example for the rest of the City. The community-wide emissions inventory identifies and categorizes the major sources and quantities of GHG emissions being produced by residents, businesses, and municipal operations taking place in the City of Tampa. Using historic emissions and business-as-usual (BAU) practices as a basis, the inventory includes GHG emissions from 2009 and projected for 2025. The Emissions Inventories are organized by Transportation, Energy, Area Sources, Water and Wastewater, and Solid Waste.

3.1 2009 Municipal Emissions Inventory

The City of Tampa emitted approximately 246,087 MT CO₂e in 2009 through its municipal operations. The emissions were calculated based on the vehicle and equipment fleet inventory and fuel use, energy accounts, waste management, and a survey of the City’s employee commutes. The largest portion of the City’s 2009 emissions was from the City’s Refuse-to-Energy Facility (35.9%), followed closely by emissions associated with wastewater treatment (34.7%). Table 3-1 summarizes the City’s net 2009 emissions of CO₂e as broken down by emissions category. Figure 3-1 is a graphical representation of Table 3-1. A detailed breakdown of 2009 emissions by category is available in Appendix D.

Category	Metric tons of CO₂e	%
Electricity	30,475	12.4
Natural Gas	1,819	0.7
Vehicle Fleet	26,629	10.8
Wastewater	85,350	34.7
Waste-to-Energy	88,398	35.9
Employee Commute	13,416	5.5
Total	246,087	100

Figure 3-1 2009 Municipal Emissions by Source (metric tons CO₂e)

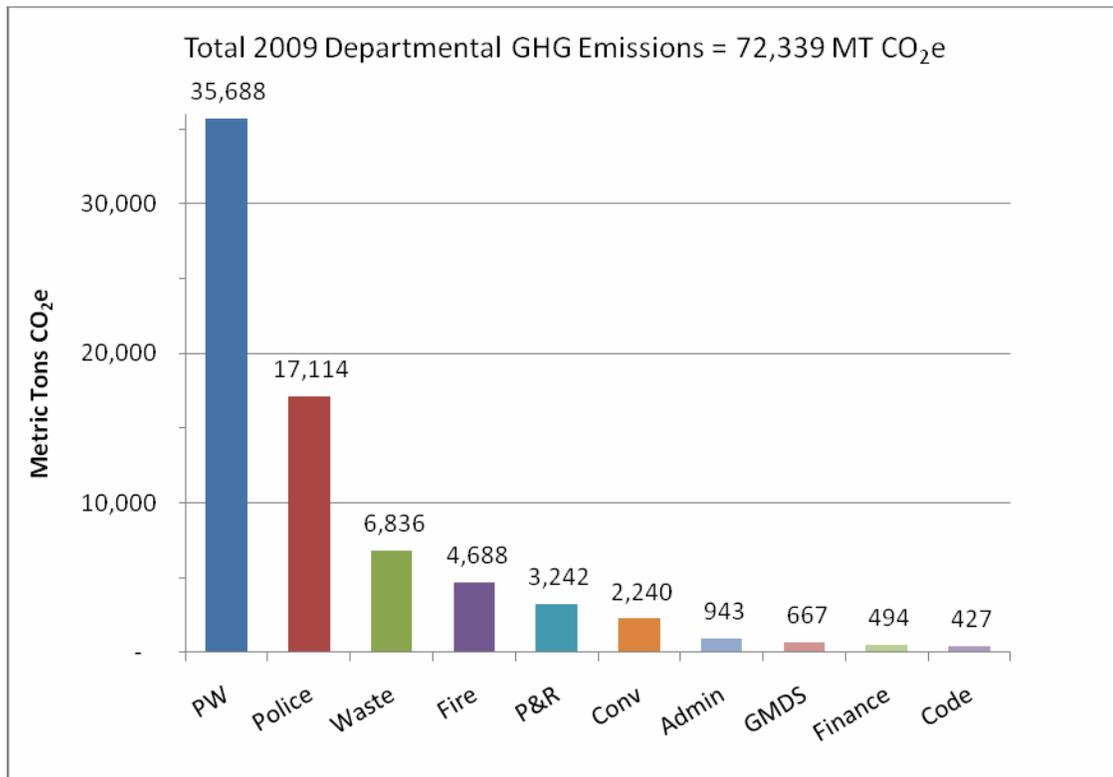


2009 Municipal Emissions and Costs by Department

For the municipal inventory it is helpful to see which departments are generating the most emissions. This helps to pinpoint from where emissions are coming. Table 3-2 and Figure 3-2, below, summarize the electricity, natural gas, and vehicle fleet emissions by department. Appendix D includes details of the data and coefficients used to calculate the municipal emissions and costs.

Department	Metric tons of CO ₂ e	Costs (\$)
Public Works	35,688	\$6,785,276
Police	17,114	\$5,398,905
Solid Waste	6,836	\$1,866,299
Fire	4,688	\$1,445,893
Parks and Recreation	3,242	\$1,126,182
Convention Center	2,240	\$372,312
Administration	943	\$517,023
GMDS	667	\$306,747
Finance	494	\$198,008
Code Enforcement	427	\$166,449
Total	72,339	\$18,183,094

Figure 3-2 2009 Municipal Emissions by Department (metric tons CO₂e)



2009 Municipal Cost Estimates

The costs associated with the inventory represent the municipal energy and fuel use costs. These cost estimates give the City the perspective on where the City is spending the most money and help to prioritize reduction measures toward the sectors that have the potential to both reduce emissions save the most money. Table 3-3 below summarizes the cost estimates for 2009.

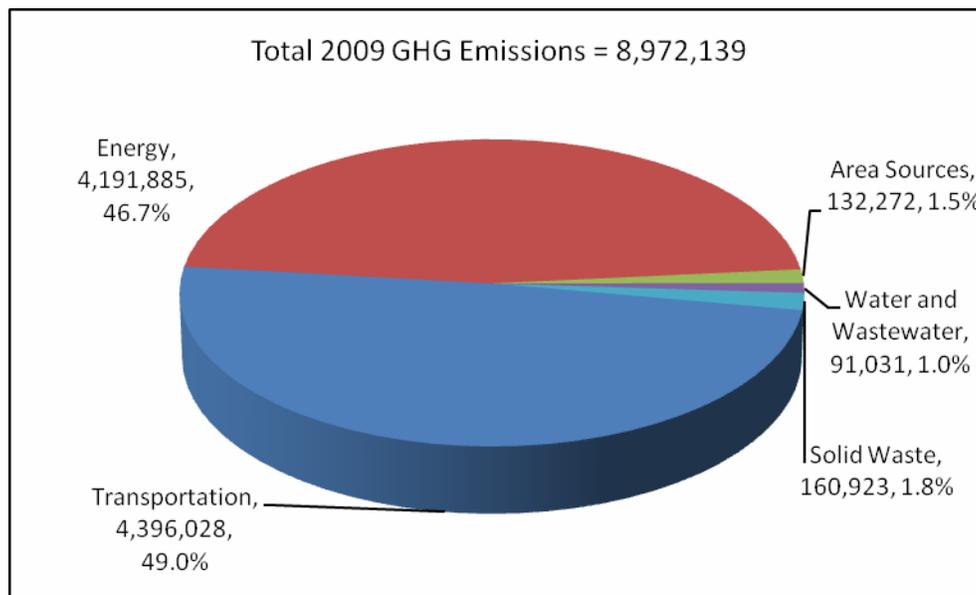
Table 3-3 Estimated Municipal Energy Costs	
Category	\$
Electricity	\$4,305,700
Natural Gas	\$260,008
Vehicle Fleet	\$6,913,020
Employee Commute	\$6,407,365
Total	\$ 18,183,094

3.2 2009 Community-Wide Emissions Inventory

The City of Tampa as a whole emitted approximately 8.97 MMT CO₂e in 2009. The emissions were calculated based on VMT estimates, data from utilities, and land use (see Appendix C for the data inputs). The largest portion of the City’s 2009 emissions were from transportation (49%), followed by emissions from electricity and natural gas use in buildings (47%). Table 3-4 summarizes the 2009 community-wide emissions of CO₂e as broken down by emissions category. Figure 3-3 is a graphical representation of Table 3-4. A detailed breakdown of 2009 emissions by category is available in Appendix E.

Table 3-4 2009 Community-Wide Net Total Emissions	
Emissions Category	Metric tons of CO ₂ e
Transportation	4,396,028
Energy	4,191,885
Area Sources	132,272
Water and Wastewater	91,031
Solid Waste	160,923
Total	8,972,139

Figure 3-3 2009 Emissions Generated by Source (metric tons CO₂e)



2009 Community-Wide Cost Estimates

The costs associated with the existing community-wide inventory represent the consumer costs associated with energy, fuel, and water use. These cost estimates give the City the perspective on where residents and business are spending the most money and help to prioritize reduction measures toward the sectors that have the potential to both reduce emissions save the most money. Transportation was the largest source of emissions and cost in 2009, while energy use in buildings followed in emissions and cost. Table 3-5 below summarizes the community-wide cost estimates for 2009.

Sources	\$ (millions)
Transportation	\$1,130.7
Energy	\$555.8
Area Sources	\$0.2
Water and Wastewater	\$8.9
Total	\$1,695

Reduction Target

The state of Florida has an emission reduction target to reduce emissions back to 1990 levels by the year 2025. For the purposes of this EECp, the reduction target for Tampa is determined based on the population change that occurred from 1990 to 2009. Tampa’s population was 280,015 in 1990 and 350,210 in 2009. Using these numbers a growth in population of 25% was calculated and used to determine Tampa’s emissions in 1990, which establishes the City’s 2025 reduction target. Table 3-6 below summarizes the 2009 emissions total and the 2025 reduction target.

Source	Metric tons of CO ₂ e
2009 Emissions	8,972,139
2025 Reduction Target	7,777,281

3.3 2025 Business as Usual Emissions Inventory

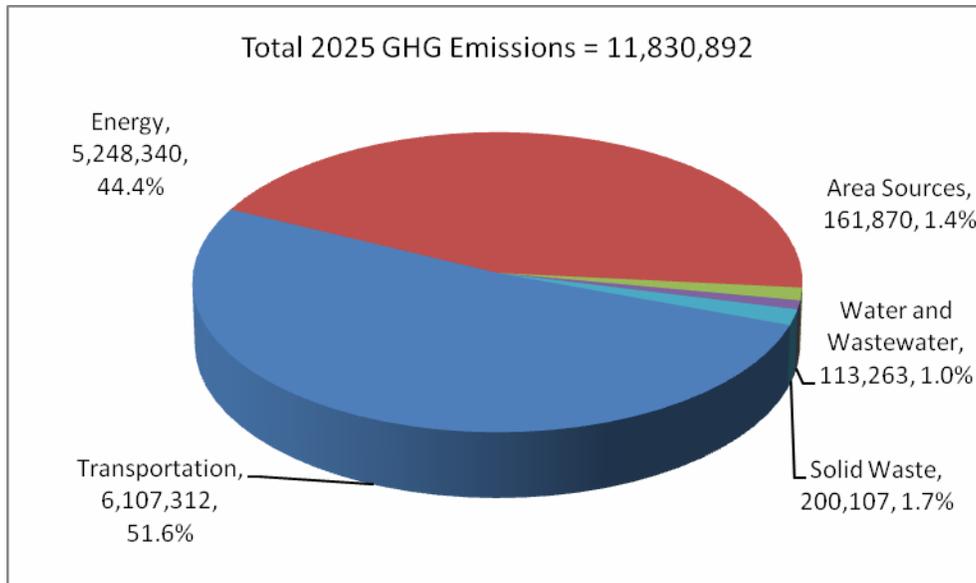
In 2025, Tampa is projected to emit a total of 11.8 MMT CO₂e community-wide from a business-as-usual (BAU) standpoint. BAU refers to continued operations and development of the City according to 2009 policies, without the inclusion of proposed or recently-adopted sustainability initiatives described in Chapter 4. The 2025 BAU community-wide emissions are estimated based on the projected growth in Tampa from 2009 to 2025 (The Planning Commission 2010). These projections include a 21.61% increase

3.3 30B2025 BUSINESS AS USUAL EMISSIONS INVENTORY

in population and a 27.23% increase in employment; these two growth rates were applied to residential and non-residential emissions, respectively, in order to estimate 2025 BAU emissions. The 2025 transportation emissions are based on the projected growth in the County’s VMT reported in the Hillsborough County MPO Long Range Transportation Plan. (Hillsborough MPO 2009) Table 3-7 summarizes the net 2025 City emissions of CO₂e as broken down by Emissions category. Figure 3-4 is a graphical representation of Table 3-7. A detailed breakdown of 2025 emissions by category is available in Appendix E.

Table 3-7 2025 Community-Wide BAU Net Total Emissions	
Emissions Category	Metric tons of CO ₂ e
Transportation	6,101,312
Energy	5,248,340
Area Sources	161,870
Water and Wastewater	113,263
Solid Waste	200,107
Total	11,830,892

Figure 3-4 2025 Community-Wide BAU Emissions by Source (metric tons CO₂e)



Net Emissions Comparison by Year

The 11.8 MMT CO₂e of GHG emissions for 2025 is an estimated increase of 2.9 MMT CO₂e above 2009 levels following BAU projections. The emissions growth from 2009 to 2025 is a 31.9% increase, which is in line with estimates for Florida’s projected emissions². Table 3-8 shows a comparison of net total emissions for 2009 and 2025 BAU emissions and the 2025 reduction target.

Table 3-8 Net Total Emissions by Year		
Source Category	Metric tons of CO₂e	
	2009	2025 BAU
Transportation	4,396,028	6,107,312
Energy	4,191,885	5,248,340
Area Sources	132,272	161,870
Water and Wastewater	91,031	113,263
Solid Waste	160,923	200,107
Total	8,972,139	11,830,892
2025 Reduction Target	-	7,777,281

² The Florida Energy and Climate Change Action Plan predicts the state’s emissions will increase by 37% from 2005 to 2025 following a BAU scenario.

CHAPTER 4 **GHG Emissions Reduction Programs and Regulations**

4.1 Existing Tampa Programs

The City of Tampa has demonstrated its commitment to sustainability through a variety of programs and policies. This commitment was first officially formalized on February 2, 2007 when Tampa signed on to support the U.S. Conference of Mayor's Climate Protection Agreement that urges the federal and state governments to enact policies and programs to reduce GHG emissions and promote efforts to address climate change at the municipal level. The following sections outline the programs and policies that target GHG reductions for Tampa's emissions both at a municipal level and community-wide.

Tampa Green Resolution

The Tampa Green Resolution, approved in May 2008, describes how the City will enact and implement measures and employ environmentally sustainable practices, policies, and methods to achieve the goal of being designated a Florida Green Local Government by the Florida Green Building Coalition (FGBC). The Resolution also describes the role and duties of the City's Green Officer to pursue additional ordinances, land development regulations and regulatory standards to assure that further public and private sector development is consistent with the City's desire to create a more sustainable community.

Tampa aims to promote green building and sustainable design efforts by reviewing and amending land development regulations, expediting permit applications with green building certifications (see discussion of Tampa Green Fast Track Review below), and proposing revisions to the City of Tampa Code, where appropriate. Also, the City will provide information to private property owners regarding the various incentives available for adopting energy efficiency and renewable energy design features. Tampa's Green Resolution also details a plan for training City staff involved with development review about green building and sustainable practices. (Tampa 2008)

EECBG Projects

The Energy Efficiency and Conservation Block Grant (EECBG) Program was funded for the first time by the American Recovery and Reinvestment Act (ARRA) of 2009 and managed by the Energy Efficiency and Renewable Energy branch of the US Department of Energy. The program is designed to assist US cities, counties, states, territories, and Indian tribes to develop, promote, implement, and manage energy efficiency and conservation project and programs. Eligible projects will reduce fossil fuel emissions, reduce total energy use, improve energy efficiency in the transportation, building, and other appropriate sectors, and create and retain jobs. Tampa has four projects funded by its EECBG:

- Traffic signal and street sign upgrade to LED's
- Energy Management Systems for three buildings
- Facility Lighting Upgrades (includes all city-owned parking garages, exterior lighting on facilities, and exterior and interior lighting upgrade for fire stations)
- Greenhouse Gas Emissions Baseline Inventory and Energy Efficiency and Conservation Plan

The traffic signal upgrades will reduce power demand by 70-80% per lamp. At a cost of \$5,500 to \$7,700 per intersection, the city will use EECBG funds to convert 480 intersections; although a significant upfront cost, Tampa will recoup that cost in reduced electrical and maintenance cost after the upgrades. The Energy Management Systems will optimize electrical consumption in city facilities by controlling operational hours of lighting, equipment, fresh air usage and the interior space temperature. Tampa will use EECBG funds to upgrade existing parking lighting to high efficiency lighting. This conversion will reduce electrical usage by 55% with an annual electrical savings of \$213,000 and annual maintenance savings of \$103,000. Costs of this project will be partially offset with a rebate from TECO. The completion of this Tampa Energy Efficiency and Conservation Plan is funded by the City's EECBG as well. (Tampa 2009)

Tampa Green Fast Track Review

Tampa has established a system for projects that meet certain sustainability criteria to warrant a faster plan review. Eligible projects can satisfy the requirements in one of two ways:

- Option A: Third Party Certification (available for any project seeking Fast Track review, but required for commercial projects of 5,000 sq. ft. or more)
- Option B: Tampa Green Checklist (available for all residential projects and commercial projects of less than 5,000 sq. ft.)

Qualifying third party certifications may come from the Florida Green Building Coalition (FGBC), Leadership in Energy Efficient Design (LEED), or another certification approved by the City. Option B requires the applicant to identify sustainable design features in the project by completing the Tampa Fast Track Review Checklist. Some examples of the design strategies include: recycling construction and demolition waste, using recycled material in concrete, using Forest Stewardship Council (FSC) Certified Wood for framing, installing graywater system, installing Energy Star-qualified windows, and using renewable flooring materials. After selecting features in the checklist, the applicant is then required to demonstrate incorporation of the design strategy in the project's plans and sign a commitment letter for items included in the project that may not be evident in the plans.

Water Conservation Program

Over the past five years, Tampa's annual water demand has continued to trend downward, which, in part, is associated with the City's active, comprehensive approach to water conservation and efficiency. Tampa's Water Conservation activities are part of a long-range water conservation planning process that incorporates the goals of responsible stewardship of Tampa's water supply, limited reliance on the regional water resources to augment Tampa's water needs during dry periods, and the use of appropriate business practices to safeguard the fiscal well-being of the Tampa Water Department while retaining already achieved water use efficiencies. The overall goal of Tampa's water conservation efforts is to ensure a sustainable water supply to meet community demands and emergency conditions. Tampa

employs a variety of water conservation measures and best management practices included in conservation planning materials provided by Conserve Florida (FDEP), Tampa Bay Water, and Southwest Florida Water Management District. Tampa's efforts include operational measures, educational and program measures, and policy measures.

Other City Initiatives

Tampa has introduced other "green" features into the community. These efforts incorporate renewable energy technologies, promote pedestrian and bicycle-friendly transit, and help to reduce waste being sent to the landfill. Having these features already implemented throughout the City help to educate the general public and make these technologies more common.

ELECTRIC VEHICLE CHARGING STATIONS

Tampa is part of a pilot program under a grant from Charge Point to install charging stations throughout the City. These charging stations are for public use and will be installed in 10 public parking locations through Tampa: Fort Brooke garage, Tampa Convention Center garage, South Regional garage, Twiggs Street garage, Centro Ybor garage, Palm Avenue garage, William F. Poe garage and the Jackson Street surface lot across from the municipal office building. All machines will be fully installed and operational by October 1, 2011. Charge Point will collect data from the charging stations and use the information to assess the use of electric vehicles in Tampa, as well as other cities in the program, and identify the best locations for future charging stations.

TAMPA ENERGY CONSERVATION GOALS

The City of Tampa developed the following goals for expanding energy conservation in municipal operations and in current City-operated programs:

- Following Tampa City Code, Chapter 17.5, continue to implement minimum energy conserving practices, such as LEED Silver certification, for new construction and major renovations of existing City buildings over 5,000 square feet.
- Continue to require green and sustainable items into its Request for Proposal for participation in the Neighborhood Stabilization Program and as part of the affordable housing design standards.
- Be a leader in energy efficient facilities management by equipping buildings with Energy Management Systems and select one of the City's buildings as a high profile demonstration project.
- Encourage the expansion of solar-thermal water heater and photovoltaic programs for residential and commercial customers.

SOLAR POWERED COMPACTORS

Solar compactors are improving the environment in major cities across the country and Tampa has joined the list with a new pilot program. In December 2010 the City of Tampa Solid Waste Department

installed four solar-powered trash compactors and two solar-powered recycling compactors in downtown Tampa along Franklin Street.

The new compactors hold approximately five times as much waste and recyclables as a regular bin of the same size. The compactors will save money and help reduce GHG emissions by requiring fewer pickups. They have a wireless communication system that track the amount of waste and recyclables in each bin indicating when they need to be emptied

GREENWAYS AND TRAILS MASTER PLAN

The Tampa Greenway and Trails Master Plan will increase public access to recreational and non-motorized transportation opportunities. The system will link parks, schools, transit bus systems, waterfront areas, and places of cultural and historical significance. The master planning process was citizen-driven and led by members of the Tampa community including local neighborhoods, businesses, community organizations and public agencies. The Plan is consistent with the Hillsborough County Metropolitan Planning Organization commitment to implementing a multi-modal transportation system that improves bicycle and pedestrian travel.

RECYCLING PROGRAMS

Tampa has expanded its curbside recycling pickup program to reduce the amount of waste being sent to the landfill. Tampa residents can dispose of yard waste and have it picked up once a week. The organic wastes that are collected are taken to a private facility where they are processed into mulch and sold for commercial use. Additionally, residents can recycle many other products including aluminum, glass, plastics, paper, and cardboard. Tampa recently expanded its plastic containers recycling program to include all #1-7 plastics.

ELECTRICITY GENERATION AT HOWARD F. CURREN WASTEWATER TREATMENT FACILITY

On average, the City of Tampa Wastewater Department produces approximately 1.18 million kilowatt hours (\$83,000 of electricity) per month by burning the methane gas from the digesters in the cogeneration engines. This equates to approximately 25 percent of the total electrical energy consumed at the Treatment Plant each month (approximately 4.8 million kilowatt hours). (Tampa 2008c)

4.2 Additional Tampa Reduction Measures

The state of Florida has set specific targets for reducing GHG emissions from the burning of fossil fuels in both power plants and vehicles by adopting various regulations. In addition, state energy efficiency and renewable requirements provide another level of reductions. In order to provide credit to the City of Tampa for regulatory actions already taken or planned by the state of Florida, this EECF first evaluates the greenhouse gas reductions that will occur within the City as a result of these actions. These will be



identified in the EECF as R1 reduction measures. The R1 measures are not administered or enforced by the City, but the City- by describing them herein- substantiates the reductions applied in association with these state measures.

R2 and R3 reduction measures are measures that will be incorporated at the City level by the year 2025 in order to provide additional reductions in GHG emissions. R2 measures are those measures that can be quantified to show the value of the reduction from the incorporation of those measures. R3 measures are measures that, although they provide a vehicle through which reductions in emissions will occur, cannot be quantified at this time. The R3 measures are supportive measures or methods of implementation for the R2 measures. Although R3 measures cannot be quantified, their implementation provides a level of assurance that the reduction goals specified in the R2 measures will be achieved. A complete list of assumptions and reductions for each of the R1 and R2 measures is included in Appendix F.

The following reduction measures are organized herein by source category (energy, solid waste, area source, and transportation) then by R1, R2, and R3 measure. The method to be used for numbering the mitigation measures will be to list the R designation (R1, R2, or R3) then an abbreviation of the source category, followed by the order number. So, R1-E1 is the first R1 measure within the energy category, R1-E2 is the second measure within the energy category, and so on. The source category abbreviations are as follows: E – energy; S – solid waste; A – area source; W – water and wastewater; and T – transportation.

Energy

R1 ENERGY REDUCTION MEASURES

The following R1 building energy efficiency related measure is a measure that Florida has identified that will result in emission reductions within the City.

R1-E1: BUILDING CODES FOR ENERGY EFFICIENCY

Florida’s Action Team on Energy and Climate Change estimated the GHG reductions and cost effectiveness of the Building Codes for Energy Efficiency legislation. They found that by 2025, the building codes would reduce emissions by 15.4 MMTCO₂e annually in 2025 statewide; this amounts to 8.4% of the state’s total emissions from electricity and RCI fuel use in 2025. The cost effectiveness of this reduction strategy is -\$30/tCO₂e, the negative indicates a cost savings over the implementation of the measure.



R2 ENERGY REDUCTION MEASURES

The following list of R2 measures are measures related to building energy efficiency that the City will implement to reduce emissions back to 1990 levels by the year 2025.

R2-E1: EECBG – TRAFFIC SIGNAL UPGRADE TO LEDS

The project provides for the upgrade of traffic signal displays to LED signal heads which will reduce power demand by 70-80% and also allow for the emergency operation of signals on backup power systems. Current signals require too much power to operate on backup systems. The estimated cost for converting an intersection is between \$5,500 to \$7,700, but the cost of the project will eventually be recovered in reduced electrical and maintenance costs. 480 intersections will be converted using funding from the City's EECBG grant. Because the EECBG grant is covering the cost of this project, the City will see immediate cost savings in electrical and maintenance costs.

R2-E2: RENEWABLE ENERGY GOAL

This strategy would set a goal for the City to have 25% of the City's electricity use coming from renewable energy sources by 2025. This measure relies heavily on coordination with the Tampa Electric Company. The City must work with the Electric Company to promote and incentivize on site renewable energy systems for residents and businesses. Although renewable energy systems have a large upfront cost, there are various rebates available (discussed in Chapter 7) and the cost savings in monthly utility bills typically offset the upfront cost in a few years.

R2-E3: RESIDENTIAL ENERGY EFFICIENCY RETROFITS

This measure involves the adoption of a program that facilitates energy efficient design for all residential buildings so that 20% of existing homes will be retrofit with energy efficient technologies such that energy use in the home is decreased by 25%.

Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar panels and/or solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

R2-E4: RESIDENTIAL RENEWABLE ENERGY RETROFITS

This measure facilitates the incorporation of renewable energy (such as photovoltaic panels) into existing residential homes. The anticipated reductions from this measure were calculated under the assumption that with incentives and other funding opportunities 20% of homes will have renewable energy systems by the year 2025. For the participating homes, the renewable energy systems will, on average, decrease the home's energy use by 50%. TECO Energy offers some rebates and incentives for residents and also offers net metering where residents are compensated for having a renewable energy system that feeds energy back to the grid.

R2-E5: COMMERCIAL ENERGY EFFICIENCY RETROFITS

This measure encourages at least 20% commercial or industrial buildings undergoing major renovations to reduce their energy consumption by a minimum of 25%. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the same measures as listed in the residential retrofit section (R2-E3).

R2-E6: COMMERCIAL RENEWABLE ENERGY RETROFITS

This measure would facilitate the incorporation of renewable (solar or other renewable) energy generation into existing commercial and office buildings. Renewable energy generation shall be incorporated such that a minimum of 50% of the project's total energy needs are met by renewable sources. The incentive program should provide enough funding and other incentives to result in approximately 20% of commercial buildings participating in this program. TECO Energy also offers net metering where businesses are compensated for having a renewable energy system that feeds energy back to the grid.

R3 ENERGY REDUCTION MEASURES

The following R3 measures enhance and/or insure the reductions from the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified.

R3-E1: ENERGY EFFICIENT DEVELOPMENT, AND RENEWABLE ENERGY DEPLOYMENT FACILITATION AND STREAMLINING

This measure would encourage the City to identify and remove regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems. This could include the updating of codes and zoning requirements and guidelines.

R3-E2: ENERGY EFFICIENCY TRAINING & PUBLIC EDUCATION

This measure would provide public education and publicity about energy efficiency measures and reduction programs available within the City, including rebates and incentives available for residences and businesses. In addition, this measure would provide training in green building materials, techniques, and practices for all plan review and building inspection staff.

R3-E3: ENERGY EFFICIENCY AND SOLAR ENERGY FINANCING

This measure would facilitate the incorporation of innovative, grant funded or low-interest financing programs for energy efficiency and renewable energy projects for both existing and new developments. This would include financing for heating, ventilation, air conditioning, lighting, water heating equipment, insulation, weatherization, and residential and commercial renewable energy. A few potential options for funding this measure include:

- Use the money from offset purchases to provide grants to allow for the offset of some of the cost to existing residents in making energy efficiency upgrades;
- Target local funds to assist affordable housing developers to incorporate renewable energy sources and energy efficiency design features into low-income housing during development or through retrofit programs.

4.2 32B ADDITIONAL TAMPA REDUCTION MEASURES

- Establish a Finance District, approve a bond purchase, and administer agreements to allow property owners to implement energy efficiency retrofits or designs and/or install renewable systems. Under this provision repayment could be incorporated as a special tax on the property owner's property tax bill.
- Funding of other incentives to encourage the use of renewable energy sources and energy efficient equipment and lighting.

R3-E4: CROSS-JURISDICTIONAL COORDINATION

Under this reduction measure the City would coordinate with other local governments, special districts, nonprofits, and other organizations, such as Hillsborough County and other cities within Hillsborough County in order to optimize energy efficiency and renewable resource development and usage throughout the City. This would allow for economies of scale and shared resources to more effectively implement these environmental enhancements.

R3-E5: ALTERNATIVE ENERGY DEVELOPMENT PLAN

The accomplishment of this measure would encourage the City to work with TECO Energy to explore the possibilities for producing energy by renewable means within the built environment. This would be developed to identify appropriate alternative energy facilities (i.e., photovoltaic) for use within residential and commercial developments. This could also incorporate the use of wind or additional solar installation in more remote areas. The Alternative Energy Development Plan will encourage the establishment of City policies and ordinances to address how alternative energy production would be conducted. This measure would identify the most optimal locations and the best means by which to avoid noise, aesthetics and other land use compatibility conflicts. Another provision of this Plan could be to identify possible sites for the production of renewable energy using local renewable sources such as solar, wind, small hydro, and/or biogas. This would encourage adopting measures to protect these resources and providing right-of-way easements, utility easements, or by setting aside land for future development of these potential production sites.

R3-E6: TAMPA FAST TRACK REVIEW

The City of Tampa currently offers a fast track review of new development plans for those plans that either meet third party certification qualifications or accumulate points assigned to various sustainable design features. This program could be expanded to include certification of compliance with the R2 measures as well as providing incentives for the completion of energy audits and certification of existing buildings. The measure enhances and supports the energy efficiency reduction programs R2-E1 through R2-E6.

Solid Waste

R1 SOLID WASTE MEASURE

The following R1 solid waste related measure is a measure that Florida has identified that will result in emission reductions within the City.

R1-S1: 75% RECYCLING GOAL BY 2020, HOUSE BILL 7135

Each county shall implement a recyclable materials recycling program that shall have a goal of recycling recyclable solid waste by 40 percent by December 31, 2012; 50 percent by December 31, 2014; 60 percent by December 31, 2016; 70 percent by December 31, 2018; and 75 percent by December 31, 2020. Counties and municipalities are encouraged to form cooperative arrangements for implementing recycling programs. – From Florida Statutes (403.706 Local government solid waste responsibilities)



In order to promote the production of renewable energy from solid waste, each megawatt-hour produced by a renewable energy facility using solid waste as a fuel shall count as 1 ton of recycled material and shall be applied toward meeting the recycling goals set forth in this section. If a county creating renewable energy from solid waste implements and maintains a program to recycle at least 50 percent of municipal solid waste by a means other than creating renewable energy, that county shall count 2 tons of recycled material for each megawatt-hour produced.

Because Tampa sends most of its waste to the McKay Bay Refuse-to-Energy Facility, the City has already met this state-wide goal.

R2 SOLID WASTE MEASURES

The following list of R2 measures are measures related to solid waste reduction that the City will implement to reduce emissions back to 1990 levels by the year 2025.

R2-S1: 12% WASTE REDUCTION GOAL BY 2018

Tampa's Comprehensive Plan, adopted in February 2009, described the City's solid waste reduction goals. By the fiscal year 2012/2013, the City hopes to reduce waste by 5 percent from the baseline disposal rate of 1.16 tons/person/year to 1.10 tons/person/year. By the fiscal year 2017/2018, Tampa hopes to reduce waste by 12 percent from the baseline to a rate of 1.02 tons/person/year. Some methods for achieving this reduction goal are described in Tampa's Comprehensive Plan and include the following:

- Continue to provide curbside household recycling service to all single family, residential customers.
- Consider pilot programs to improve recycling rates.

- Coordinate with multi-family and condominium complexes to encourage recycling activities.
- Seek out and utilize grants for local governments from the Florida Department of Environmental Protection to initiate and maintain waste recycling and separation programs.
- Research and consider recycling ash products from the McKay Bay Refuse-to-Energy Facility.

R2-S2: NO WASTE SENT TO LANDFILL

This strategy would eliminate all waste that is currently sent to the landfill. Tampa's waste-to-energy facility offers an alternative to the landfill that creates energy from the City's waste and delivers much less emissions per pound of waste disposed as compared to the landfill. Currently, the City has some waste that cannot be processed through the waste-to-energy system, such as large furniture. With the purchase of a shredder, the City would be able to breakdown these large items into a size that can be processed. The additional waste processed equates to more energy that can be purchased by TECO. All waste-to-energy facilities produce large amounts of ash. Options for recycling the ash are currently being explored; these options include utilizing the material in the production of roads, cinder blocks, and other construction materials.

R3 SOLID WASTE MEASURE

The following R3 measure enhances and/or insures the reductions accounted for within the R2 measures through education programs that help participation and compliance of the R2 measures identified above.

R3-S1: WASTE EDUCATION PROGRAM

This measure would build on the existing Tampa Waste education programs to provide City-wide public education and increased publicity about commercial and residential recycling. This measure would educate the public about waste reduction options available at both residential and commercial levels, including composting, grass recycling, and waste prevention, and available recycling services.

Area Source Emissions

R2 AREA SOURCE MEASURES

The following R2 reduction measure is related to landscaping emissions that the City will implement to reduce emissions back to 1990 levels by the year 2025.

R2-A1: ELECTRIC LANDSCAPING EQUIPMENT IN NEW DEVELOPMENTS

This measure involves the inclusion electric sockets on the exterior walls of new developments to make buildings ready for the use of electric landscaping equipment. The gasoline used in traditional lawnmowers emits large amounts of GHGs; electric-powered equipment has a much lower emission level. Additionally, electric-powered equipment is cleaner from an air pollution standpoint. These emission calculations assume



that 25% of homes and 50% of commercial buildings will use electric powered equipment by the year 2025.

R3 AREA SOURCE MEASURES

The following R3 measures are related to landscaping that will help reduce GHG emissions. These measures strategically place trees and other landscape mechanisms that create shade to reduce the heat island effect within parking lots and adjacent to buildings, which in turn, reduces the temperature of buildings and cars during the summer.

R3-A1: EXPAND CITY TREE PLANTING

The City should evaluate the feasibility of expanding tree planting within the City. This includes the evaluation of potential carbon sequestration (the process by which carbon is taken from the environment and stored. In the case of trees and vegetation this occurs through the conversion of carbon into biomass –leaves, wood, etc.) from different tree species, potential reductions of building energy use from shading, and GHG emissions associated with pumping water used for irrigation. Implement a forestry program if GHG emissions reductions exceed GHG emissions associated with implementation and water use.

R3-A2: HEAT ISLAND PLAN

The implementation of this measure would include guidelines for cool roofs, cool pavements, and strategically placed shade trees, and parking lot shading in the City. Further, City-wide design guidelines could to be amended to encourage new developments and major renovations (additions of 25,000 square feet or more) to incorporate the following strategies such that heat gain would be reduced for 50% of the non-roof impervious site landscape (including parking, roads, sidewalks, courtyards, and driveways). The strategies include:

- Shading (within 5 years of occupancy);
- Paving materials with a Solar Reflective Index (SRI) of at least 29;
- Open grid pavement system; or
- Covered parking (with shade or cover having an SRI of at least 29).

Transportation

R1 TRANSPORTATION MEASURES



The following list of R1 transportation related measures are those measures that Florida has identified that will result in emission reductions within the City.

R1-T1: “10 BY 10” RENEWABLE FUEL STANDARD

HB 7135, passed in 2008, includes a provision to have a minimum of 10 percent of ethanol blended into gasoline by the year 2010. Florida’s Energy and Climate Change Action Plan includes estimates for the greenhouse gas reductions and

4.2 32B ADDITIONAL TAMPA REDUCTION MEASURES

cost savings anticipated from this state policy. Developing and Expanding Low-GHG Fuels is predicted to reduce annual emissions by 12.62 MMtCO₂e statewide in the year 2025; this amounts to a reduction of 6.3% from Florida's transportation emissions in 2025. The strategy has a cost effectiveness or - \$142/tCO₂e; the negative sign indicates a cost savings for the implementation of this measure over the timeframe from 2010 to 2025.

R1-T2: FEDERAL CAFE STANDARDS

On May 19, 2009, President Obama announced a new plan to establish vehicle greenhouse gas standards and to significantly increase fuel economy standards by model year (MY) 2016. As part of that plan, the National Highway Traffic Safety Administration (NHTSA) and EPA worked together to harmonize those standards to the extent possible, as they announced in a proposed rulemaking on September 15, 2009. On April 1, 2010, the agencies announced a final rule for MY2012 through MY2016. According to the Administration, the new greenhouse gas standards are equivalent to a Corporate Average Fuel Economy (CAFE) increase to 35.5 mpg by MY2016, effectively implementing the CAFE level required by the Energy Independence and Security Act (EISA) four years ahead of schedule. The development of the new CAFE standards was integrated with new vehicle GHG standards proposed by EPA, and with standards established by the state of California. EPA and NHTSA believe they have the technical data to support a GHG standard of 250 grams/mile.

R2 TRANSPORTATION MEASURES

The following list of R2 measures are measures related to transportation reduction that the City will implement to reduce emissions back to 1990 levels by the year 2025.

R2-T1: SMART GROWTH PLANNING

The City of Tampa has updated its comprehensive plan and the Transportation Concurrency Exception Area (TCEA). The strategy is to focus new development and redevelopment into three main locations – Downtown, the Westshore business district, and around the University of South Florida (USF). The concept is to create urban residential, commercial, and business locations that will support alternate modes of transportation – walking, biking, and transit. The City has adopted land development ordinances that promote transit-oriented development, and provide incentives to those developments that fit the TCEA concept. Supporting the City's TCEA will have multiple impacts on GHG reductions. First, more people can live in close proximity to the business locations in each area, thereby reducing commuting distances. Second, the planned transit for these areas will provide connectivity and encourage transit use both within and between these areas. Third, the availability and attractiveness of other non-motorized modes combined with compact, mixed-use development will contribute to reduce VMT.

R2-T2: TBARTA MASTER PLAN

Tampa Bay Area Regional Transportation Authority (TBARTA) is made up of representatives from seven counties in the Tampa Bay region with Tampa's Mayor serving as the City's representative on TBARTA's governing board. The Master Plan visions an extensive transportation network of regional bus systems, light rail, and local transit systems. The interconnectedness of the City of Tampa to other regions will

reduce emissions from residents traveling outside the City and especially from the large number of commuters entering the City daily.

R2-T3: EXPAND USE OF LOW/ZERO EMISSION VEHICLES

Tampa can expand the use of low emission vehicles by offering discounted or preferred parking privileges at City facilities and creating an ordinance for new development requirements to reserve preferred parking spaces for ultra low emissions vehicle (ULEV) and/or high occupancy vehicles (HOV). Tampa has plans for installing 10 charging stations throughout the City. The stations are part of the Charge Point America program; the program is sponsored by Coulomb Technologies through the American Recovery and Reinvestment Act and the Transportation Electrification Initiative administered by the Department of Energy. The goal of the program is to provide electric vehicle charging infrastructure to regions in the US and foster the adoption and readiness of EV's throughout the country.

Tampa's charging stations will be located at the following public parking garages: Fort Brooke, Tampa Convention Center, South Regional, Twiggs Street, Centro Ybor, Palm Avenue, William F. Poe, and Jackson Street surface lot across from the municipal office building. All ten machines will be fully installed and operational by October 1, 2011. The Charge Point program includes a data collection phase from October 2011 until October 2013; the data will be used to determine how the stations are being utilized and where additional charging stations can be installed.

R2-T4: BICYCLE INFRASTRUCTURE

Tampa can encourage residents to ride a bike rather than driving around town by providing the infrastructure to do so. This involves increasing the mileage of bike lanes and bike paths throughout the City and incorporating bicycle facilities at transit centers. Studies have shown that increasing the accessibility of bicycle infrastructure increases the percentage of residents riding a bicycle over a single occupancy vehicle. Tampa's Comprehensive Plan and Greenway and Trails Master Plan outlines future bicycle infrastructure in the City. As a conservative estimate, emission reduction calculations assume that 15 miles of bikeways will be constructed by 2025.

R2-T5: ENCOURAGE TELECOMMUTING AND ALTERNATIVE WORK SCHEDULES

Encouraging telecommuting and alternative work schedules reduces the number of commute trips and therefore VMT traveled by employees. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks. Tampa can explore incentivizing this strategy for employers, targeting large employers; Tampa can include a reduced parking element on the City's Green Fast Track Review checklist in order to encourage employers. The emission calculations assume a 3% participation rate of each type of alternative work schedule: 9/80 work week, 4/40 work week, and 1.5 days of telecommuting each week.



R3 TRANSPORTATION MEASURE

The following R3 measure enhances and/or insures the reductions accounted for within the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified.

R3-T1: REGIONAL LAND USE & TRANSPORTATION COORDINATION

Transportation is an inherently regional source of emissions. In order to accomplish the greatest emissions reductions, Cities, Counties, and Regional agencies must all work together to create cohesive systems for alternative forms of transportation.

Water

The following R2 measure is related to water reduction that the City will implement to reduce emissions back to 1990 levels by the year 2025.

R2-W1: TAMPA WATER DEPARTMENT CONSERVATION EFFORTS

In response to rapid population growth, record drought conditions and projected future water supply deficits, the Tampa Water Department (TWD) implemented a formal Water Conservation Program that has been recognized around the nation for its leadership, innovation, and achieved demand reductions (Tampa 2010b). Since 1989, when the program was launched, the total population served by the TWD has increased by nearly 30 percent while the average daily pumpage has increased by 10 percent or less and per capita use has decreased. If the TWD can continue to implement policies to conserve water and continue to decrease the per capita water use, this will help to maintain total water pumped and offset the anticipated growth in emissions out to 2025. Policies to conserve water and reduce use from new and existing buildings include, but are not limited to:

- Promotion of low-flow fixtures: toilets, showerheads, faucets, etc.
- Incentive programs for efficient clothes washers and dishwashers
- Green Fast Track Review incentive for inclusion of water-saving designs in new construction
- Offering water audits and leak detection services to residents and businesses

Emissions Reductions and Cost Savings

Implementation of the measures described above will reduce Tampa's emissions back to 1990 levels by the year 2025. Additionally, these measures will equate to dollars saved throughout Tampa's community. Table 4-1, below summarizes both the emissions saved and the annual dollars saved for each measure described above. The dollars saved were calculated solely based on the fuel savings. For example, if a measure reduces gallons of gasoline used, the cost savings were calculated by multiplying the gallons saved by the average cost per gallon of gasoline. These dollar amount represent savings over the course of a year, and fuel costs are representative of current costs.

Not all measures have a cost savings calculated; these measures do not have direct fuel savings and would have much more speculation in determining the cost savings.

Table 4-1 GHG Emissions Reduced and Cost Savings		
Reduction Measure	MT CO₂e Reduced	\$ Saved (millions)
Energy Reduction Measures		
R1-E1: Updated Building Codes	440,885	\$57.7
R2-E1: EECBG – Traffic Signal Upgrade to LEDs	4,806	\$0.65
R2-E2: Renewable Energy Goal: 25% by 2025	1,013,640	-
R2-E3: Residential Energy Efficiency Retrofits	66,335	\$8.7
R2-E4: Residential Renewable Energy Retrofits	135,485	\$17.7
R2-E5: Commercial Energy Efficiency Retrofits	102,069	\$13.3
R2-E6: Commercial Renewable Energy Retrofits	199,546	\$26.1
R2-W1: Tampa Water Department Conservation Efforts (electricity emissions)	64,414	\$8.8
Solid Waste		
R2-S1: 12% Waste Reduction Goal by 2018	21,926	-
R2-S2: No Waste Sent to Landfill	23,744	-
Area Source		
R2-A1: Electric Landscaping Equipment in New Developments	44,793	\$2.1
Transportation		
R1-T1: 10% less carbon by 2010	207,649	-
R1-T2: CAFE Standards	1,179,933	-
R2-T1: Smart Growth Planning	66,076	\$21.9
R2-T2: TBARTA Master Plan	190,800	\$63.5
R2-T3: Expand Use of Low/Zero Emission Vehicles	22,314	\$7.4
R2-T4: Bicycle Infrastructure	197,187	\$65.6
R2-T5: Encourage Telecommuting and Alternative Work Schedules	58,615	\$19.5
Water		
R2-W1: Tampa Water Department Conservation Efforts	22,232	\$2.2
TOTAL	4,062,448	\$311.0

CHAPTER 5 **Total Estimated Reductions**



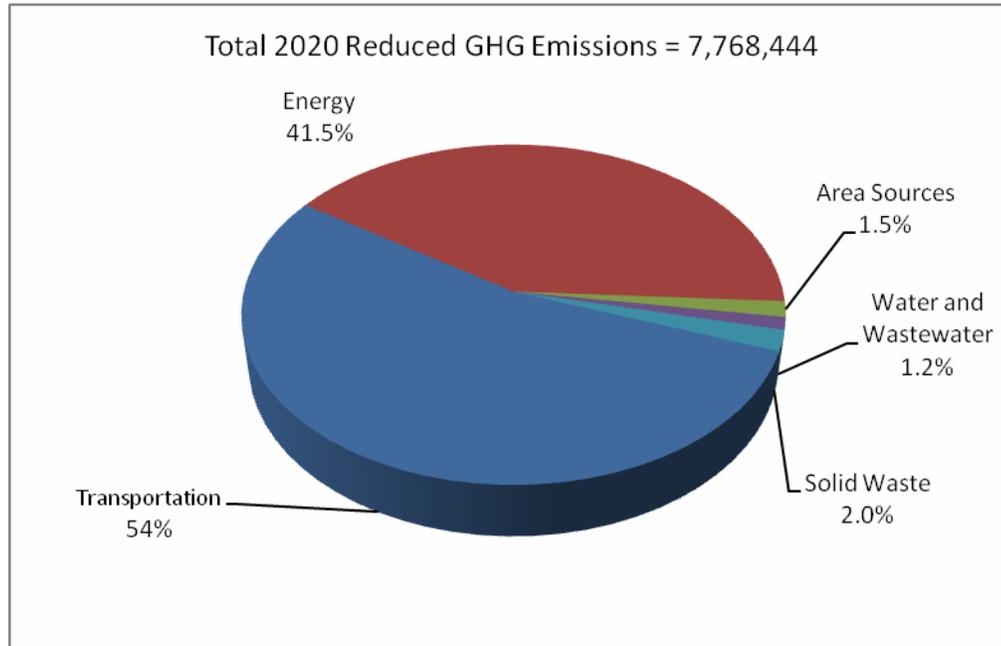
In 2025, the City of Tampa is projected to emit a total of 11.8 MMT of CO₂e without the incorporation of the reduction measures shown in Section 4. With their incorporation, the City emissions for 2025 are estimated to be reduced to 7.77 MMT CO₂e. Emission reductions estimated for year 2025 were based on the accomplishments likely to be achieved as based on the incorporation of the measures detailed in Section 4. A detailed description of the reduction calculations, including assumptions and percentage reduction, is included as Appendix F.

5.1 Reduced 2025 Emissions

Table 5-1 summarizes the net reduced 2025 City emissions of CO₂e as broken down by Emissions category. Figure 5-1 is a graphical representation of Table 5-1. A detailed breakdown of reduced 2025 emissions by category is available in Appendix E.

Table 5-1 Reduced 2025 Net Total Emissions	
Emissions Category	Metric tons of CO₂e
Transportation	4,184,739
Energy	3,221,160
Area Sources	117,077
Water and Wastewater	91,031
Solid Waste	154,438
Total	7,768,444

Figure 5-1 Reduced 2025 Emissions by Emissions Category (metric tons CO₂e)



5.2 Net Emissions Comparison by Year

The 7.77 MMT of CO₂e of Reduced GHG emissions for 2025 are an estimated decrease of 4.06 MMT CO₂e from 2025 BAU and a decrease of 904,875 MT CO₂e from 2009 levels. Table 5-13 shows a comparison between the 2009 and 2025 levels, including what the 2025 BAU emissions would have been without the implementation of, and what they are anticipated to be with, the inclusion of the proposed reduction measures.

Source Category	Metric tons of CO ₂ e			% Reduced from BAU
	2009	BAU 2025	Reduced 2025	
Transportation	4,396,028	6,101,312	4,184,739	31.5%
Energy	4,191,885	5,248,340	3,221,160	38.6%
Area Sources	132,272	161,870	117,077	27.7%
Water and Wastewater	91,031	113,263	91,031	19.6%
Solid Waste	160,923	200,107	154,438	22.8%
Total	8,972,139	11,830,892	7,768,444	34.3%
2025 Emission Reduction Target	-	7,777,281	7,777,281	-

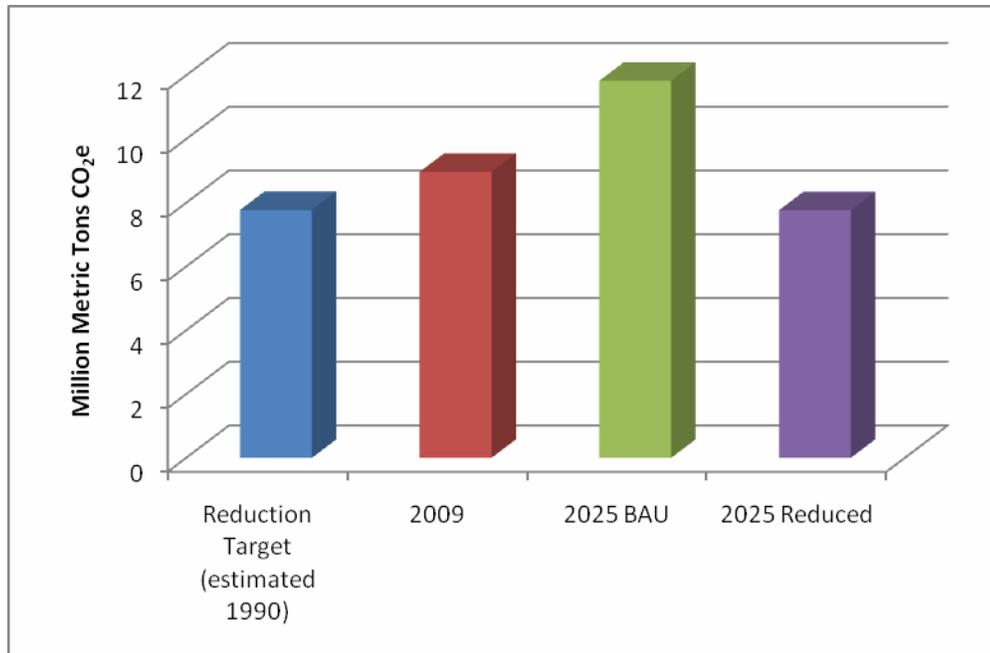
Note: Mass emissions of CO₂e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.

This page intentionally left blank.

CHAPTER 6 **Conclusions**

This Tampa Energy Efficiency and Conservation Plan serves as a guide to help the City continue development with the objectives of conserving resources, creating a sustainable community, and reducing GHG emissions. This document also serves as a technical resource for the preparation of land use-related documents that may require evaluation and documentation of GHG emissions. Figure 6-1 shows a comparison between the 2009 emissions, 2025 BAU emissions, and 2025 reduced emissions.

Figure 6-1 Total Emissions by Year (metric tons CO₂e)



A target has been set to reduce GHG emission emissions to 1990 levels by the year 2025 City-wide, consistent with the state reduction goals in Florida’s Energy and Climate Change Action Plan. The City has a reduction strategy, as described in Section 4, which will allow Tampa to achieve the state reduction goal. Such programs include the City’s energy efficiency programs, solar rebates, conservation programs, incentives and ordinances. In some cases, implementation will require the cooperation of other agencies, private businesses, and residents. The success of these measures will be tracked using indicators and targets such as those described in this EECP. Even with the anticipated growth in the City, the modernization of vehicle fleets, combined with the continued implementation of the proposed R2 and R3 measures, will ensure a reduction of City-wide GHG emissions by approximately 4.06 MMT CO₂e by 2025 from the levels expected under a 2025 Business as Usual (BAU) scenario and a reduction of 904,875 MT CO₂e from 2009 levels.

CHAPTER 7 **Implementation**

This section describes implementation steps for the EECPP to support achievement of the GHG reduction goals for the community at large. Success in meeting the City’s GHG emission reduction goal will depend on cooperation, innovation, and participation by the City and residents, businesses, and government entities in the City’s land use jurisdiction with regards to implementing the EECPP. This section outlines key steps that the City will follow for the implementation of this EECPP.

7.1 STEP 1—Administration and Staffing

Tampa has already designated a staff member as the City’s Green Officer (CGO) through the Green Ordinance passed in May of 2008. The Ordinance outlined many of the CGO’s duties to promote sustainability within the City’s own municipal operations as well as throughout the Tampa community. The CGO is also tasked with monitoring and minimizing energy consumption, reducing and offsetting GHG emissions, and promoting the development and use of renewable energy sources. The CGO will be a vital staff member in coordinating, overseeing, and documenting implementation of the reduction measures and providing periodic monitoring of emissions.

The CGO will, at a minimum, coordinate with the following departments, but will be expanded as needed to ensure coordinated leadership in plan implementation:

- Land Development Coordination— (LDC) can provide expertise in the Green Fast Track Review process and provide long-term planning support.
- Public Works—Public Works can provide expertise in the City’s operations and collaborate with the CGO to implement various aspects of the plan.

7.2 STEP 2—Financing and Budgeting

The Implementation of the EECPP will require creative, continuing, and committed financing in order to work. Local, regional, state, and federal public sources of funding will be needed along with the substantial involvement of the private sector. The following different financing options will be explored by the City:

- State and Federal Grants and Low-interest Loans —As described below there are a variety of grant and loan programs that exist in various sector areas.
- Support from Local Businesses, Non-Profits, and Agencies—Opportunities for public/private partnerships (like the existing TECO partnerships) exist to provide cooperation on many aspects of the EECPP including energy efficiency retrofits, waste minimization, transit promotion, and education.
- Self-Funding and Revolving Fund Programs—Innovative programs to fund residential solar investments.

- **Agreements with Private Investors**—Energy service companies (ESCOs) and other private companies can finance up-front investments in energy efficiency and then be reimbursed through revenues from energy savings.
- **Taxes and Bonds**—Various municipalities have used targeted finance instruments for solar, transportation, vehicle improvements, and landfill methane controls.

Given that financing is key to implementing many measures, a review of current and potential funding sources was completed for the different sectors covered in this EECF and is presented below to help early phase implementation of the EECF. Whether at the federal, regional, or state level, it appears likely that there will be some form of a cap and trade system in place within several years. This system, depending on its particular character, is likely to influence energy prices (such as for electricity, natural gas, and vehicle fuels), and may make currently cost-ineffective measures more economically feasible in the medium term and allow the financing of a broader range of plan measures.

Energy Efficiency and Renewable Energy Financing

FEDERAL ENERGY EFFICIENCY COMMUNITY BLOCK GRANTS (EECBG)

As part of the stimulus package (the “American Recovery and Reinvestment Act” or ARRA), signed into law by President Obama in spring 2009, block grants became available for energy efficiency planning and improvements in the building, transportation, and other sectors. The purpose of the EECBG Program is to assist eligible entities in creating and implementing strategies to: reduce fossil fuel emissions in a manner that is environmentally sustainable and that maximizes, to the greatest extent practicable, benefits for local and regional communities; reduce the total energy use of the eligible entities; and improve energy efficiency in the building sector, the transportation sector, and other appropriate sectors. Eligible activities include: development of an energy efficiency and conservation strategy; technical consultant services; residential and commercial building energy audits; financial incentive programs; energy efficiency retrofits; energy efficiency and conservation programs for buildings and facilities; development and implementation of certain transportation programs; building codes and inspections; certain distributed energy projects; material conservation programs; reduction and capture of methane and greenhouse gases from landfills and dairies; efficiency traffic signals and street lighting; renewable energy technologies on government buildings; and other appropriate activity. Tampa received EECBG funds to be used for traffic signal upgrades, parking light upgrades, and advancement of energy management systems.

FEDERAL TAX CREDITS FOR ENERGY EFFICIENCY

On October 3, 2008, President Bush signed into law the “Emergency Economic Stabilization Act of 2008.” This bill extended tax credits for energy efficient home improvements (windows, doors, roofs, insulation, HVAC, and non-solar water heaters). These residential products during 2008 were not eligible for a tax credit, as tax credits had expired at the end of 2007. The bill also extended tax credits for solar

energy systems and fuel cells to 2016. New tax credits were established for small wind energy systems and plug-in hybrid electric vehicles. Tax credits for builders of new energy efficient homes and tax deductions for owners and designers of energy efficient commercial buildings were also extended. (See: [http://www.energysavers.gov/financial/.](http://www.energysavers.gov/financial/))

TECO ENERGY EFFICIENCY / RENEWABLE ENERGY INCENTIVES

■ Residential Programs

- Free energy audits
- Building envelope improvement incentives: ceiling insulation, wall insulation, window replacement, window film
- Heating and cooling program: earn rebates for replacing old, inefficient air conditioning systems with new, energy-efficient heat pumps
- Free duct system evaluation and repair of leaks
- Low income weatherization program (partnership with The Centre for Women)
- Similar incentives also offered for new residential construction

■ Business Programs

- Free energy audits
- Building envelope improvement incentives: Solar window film installation, wall and ceiling insulation
- Upgraded chiller, lighting, cooling, refrigeration, and water heating
- Commercial duct repair
- Lighting occupancy sensors
- Conservation Value Program: earn up to \$250 per average kW reduction
- Load Management Program: earn credit for allowing Tampa Electric to temporarily interrupt power to the equipment chosen (such as air conditioning or refrigeration) during high peak demand.

CLEAN RENEWABLE ENERGY BONDS

Clean renewable energy bonds (CREBs) can be used by certain entities—primarily in the public sector—to finance renewable energy projects. The list of qualifying technologies is generally the same as that used for the federal renewable energy production tax credit. CREBs may be issued by electric cooperatives, government entities (states, cities, counties, territories, Indian tribal governments, or any political subdivision thereof), and certain lenders. The advantage of CREBs is that they are issued—*theoretically*—with a zero (0) percent interest rate. The borrower pays back only the principal of the

bond, and the bondholder receives federal tax credits in lieu of the traditional bond interest. (See http://www.irs.gov/irb/2007-14_IRB/ar17.html.)

HB 7179 ENERGY FINANCING

House Bill 7179 establishes the Property Assessed Clean Energy (PACE) Program for Florida. PACE allows local governments to finance renewable energy and storm-resistance improvements for local residents and businesses. Qualifying improvements include: energy conservation and efficiency improvements, renewable energy improvements, and wind resistant improvements. Under the Bill, local governments can adopt either an ordinance or resolution which will allow local governments to provide upfront funds to cover the costs for the qualifying improvements. Financing is repaid through the property tax bill and repayment obligations remain with the property when it is sold to a new owner. The PACE program is currently on hold, but is expected to remain an option for energy financing in the future.

CAPITAL INVESTMENT TAX CREDIT FOR CLEAN ENERGY

In 2008, Florida established the Capital Investment Tax Credit for high-impact sectors with the purpose of attracting and growing capital-intensive industries to Florida. The annual tax credit is 5% of eligible capital costs generated by qualifying projects for a maximum of 20 years. A qualifying project is a new or expanding facility located in Florida that is in a high-impact sector, as defined by Enterprise Florida, Inc. Currently, high-impact sectors include clean energy, biomedical technology, financial services, information technology, silicon technology and transportation equipment manufacturing. Projects must include an investment of at least \$25 million in eligible capital costs, among other criteria.

The annual tax credit is limited by the annual corporate income tax liability of the project. The following tax credit limits apply:

- Capital investment of at least \$100 million: 100% of the annual corporate tax liability
- Capital investment between \$50 million and \$100 million: 75% of the annual corporate tax liability
- Capital investment between \$25 million and \$50 million: 50% of the annual corporate tax liability

Solar manufacturing facilities may transfer tax credits earned through this program. In order to qualify for this transfer, solar manufacturing companies must create at least 400 jobs within six months of beginning operations. The average annual salary of employees must be \$50,000 or higher.

SOLAR ENERGY EQUIPMENT SALES TAX EXEMPTION

Solar energy systems have been exempt from Florida's sales and use tax since July 1, 1997. The term "solar energy system" means the equipment and requisite hardware that provide and are used for collecting, transferring, converting, storing or using incidental solar energy for water heating, space heating and cooling, or other applications that would otherwise require the use of a conventional source of energy such as petroleum products, natural gas, manufactured gas or electricity. Vendors of solar energy systems or components are required to document exempt sales.

This exemption was originally set to expire July 1, 2002, but was extended an additional three years. In May 2005, the exemption was made permanent with the enactment of HB 805.

The Florida Solar Energy Center certifies to the Department of Revenue a list of eligible equipment and hardware. The list is provided here. Sellers of solar energy systems or components thereof are required to document exempt sales. The Department of Revenue recommends that a form be completed by the purchaser and presented to the seller.

Transportation Financing

FEDERAL ENERGY EFFICIENCY COMMUNITY BLOCK GRANTS (EECBG)

As described above, eligible activities include development and implementation of certain transportation programs and efficiency traffic signals and street lighting.

STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

The State Transportation Improvement Program (STIP) is a federally mandated document which must include a listing of projects planned with federal participation in the next four fiscal years. Although the STIP is approved annually by FHWA at the beginning of each federal fiscal year (October 1st), FHWA allows FDOT to report these four years on a state fiscal year basis (July 1st thru June 30th). This is because the report is based upon the federally funded projects listed in the first four years of FDOT's Adopted Five Year Work Program.

TRANSPORTATION IMPROVEMENT PROGRAM (TIP)

Hillsborough MPO develops the Transportation Improvement Program (TIP). The TIP is a listing of all capital transportation projects proposed over a five-year period for the Hillsborough region. Projects include highway improvements, transit, rail and bus facilities, carpool lanes, signal synchronization, intersection improvements, freeway ramps, and other related improvements. The TIP report is developed annually.

ELECTRIC VEHICLE CHARGING EQUIPMENT FINANCING

Property owners may apply to their local government for funding to help finance installations of EV charging equipment at their property or enter into a financing agreement with the local government for the same purpose. (Reference House Bill 7179, 2010, and Florida Statutes 163.08)

Water Conservation and Treatment Financing

CLEAN WATER STATE REVOLVING FUNDS

CWSRFs fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management. CWSRFs have funded over \$74 billion, providing over 24,688 low-interest loans to date. (See <http://www.epa.gov/owm/cwfinance/cwsrf/index.htm> for more details.) CWSRF's offer:

- **Low Interest Rates, Flexible Terms**—Nationally, interest rates for CWSRF loans average 2.1 percent, compared to market rates that average 4.3 percent. For a CWSRF program offering this rate, a CWSRF funded project would cost 18 percent less than projects funded at the market rate. CWSRFs can fund 100 percent of the project cost and provide flexible repayment terms up to 20 years.
- **Funding for Nonpoint Source Pollution Control and Estuary Protection**—CWSRFs provided more than \$240 million in 2007 to control pollution from nonpoint sources and for estuary protection, more than \$2.6 billion to date.
- **Assistance to a Variety of Borrowers**—The CWSRF program has assisted a range of borrowers including municipalities, communities of all sizes, farmers, homeowners, small businesses, and nonprofit organizations.
- **Partnerships with Other Funding Sources**—CWSRFs partner with banks, nonprofits, local governments, and other federal and state agencies to provide the best water quality financing source for their communities.

7.3 STEP 3—Timeline and Prioritization

The City will develop an implementation schedule based on the completion of the full cost effectiveness analysis financing availability. Prioritization will be based on the following factors:

- Cost effectiveness;
- GHG reduction efficiency;
- Availability of funding;
- Level of City Control;
- Ease of implementation; and
- Time to implement.

In general consideration of these factors, the following is an outline of key priorities for three (3) phases starting in 2011 through 2025.

- **Phase 1 (2011–2015):** Development of key ordinances (such as a green building ordinance, expansion of waste reduction goals, etc.), completion of key planning efforts (e.g., Climate Finance Plan, regional land use/transportation planning); implementation of most cost-effective measures (e.g. EECBG projects, energy efficiency retrofits, electric vehicle charging stations, rideshare/carpool measures, etc.); and support of voluntary efforts.
- **Phase 2 (2015–2020):** Continued implementation of first tier measures, implementation of second tier measures (new building solar requirements, expansion of renewable energy, etc.); and implementation of key planning outcomes from Phase 1 (regional transportation planning, etc.)

- Phase 3 (2020–2025): Continued implementation of first and second tier measures, implementation of third tier of measures (expand renewable energy use, further bicycle infrastructure improvements, etc.).

Flexibility in Implementation

Because the goals of this EECPP are aggressive, success in meeting the EECPP goals depend on some flexibility in the GHG reduction actions. The City is committed to flexibility in implementing the reduction measures, meeting the goals of this EECPP, and saving money through energy efficiency and independence. Not all reduction measures will be implemented immediately; some will be phased in over time up to 2025 and beyond. Many of the reduction measures in this Plan may be implemented through a menu of options; the goals of each reduction measure can often be achieved through a variety of means, especially those related to building energy efficiency. For example, the City will develop energy efficient design programs (measures R2-E3 and R2-E5), and compliance with the energy efficient design programs can be achieved through many combinations of actions including (but not limited to): installing energy efficient appliances, lighting, and HVAC systems; installing solar panels and solar water heaters; siting and orienting buildings to optimize conditions for natural heating, cooling, and lighting; installing top-quality windows and insulation; and incorporating natural shading, skylights, and reflective surfaces.

Table 7-1 presents the potential timeline and phasing schedule for the GHG reduction measures. Note that some of the reduction measures occur within all three phases. Reduction measures, such as energy efficiency retrofits will be staged within the three phases to allow for staggered funding of the retrofit incentives.

Table 7-1 GHG Reduction Measure Timeline and Phasing Schedule	
Reduction Measure	Phase
Energy Reduction Measures	
R2-E1: EECBG – Traffic Signal Upgrade to LEDs	1
R2-E2: Renewable Energy Goal: 25% by 2025	1,2,3
R2-E3: Residential Energy Efficiency Retrofits	1, 2, 3
R2-E4: Residential Renewable Energy Retrofits	1, 2, 3
R2-E5: Commercial Energy Efficiency Retrofits	1
R2-E6: Commercial Renewable Energy Retrofits	2
Solid Waste	
R2-S1: 12% Waste Reduction Goal by 2018	1, 2
R2-S2: No Waste Sent to Landfill	1, 2, 3
Area Source	
R2-A1: Electric Landscaping Equipment in New Developments	1

Table 7-1 GHG Reduction Measure Timeline and Phasing Schedule

Reduction Measure	Phase
Transportation	
R2-T1: Smart Growth Planning	1, 2, 3
R2-T2: TBARTA Master Plan	2, 3
R2-T3: Expand Use of Low/Zero Emission Vehicles	1
R2-T4: Bicycle Infrastructure	1, 2, 3
R2-T5: Encourage Telecommuting and Alternative Work Schedules	1, 2, 3
Water	
R2-W1: Tampa Water Department Conservation Efforts	1, 2, 3

7.4 STEP 4—Public Participation

The citizens and businesses in Tampa are integral to the success of GHG reduction efforts. Their involvement is essential in order to reach the reduction goals because this EECF depends on a combination of state and local government efforts, public and private sources of finance, and the voluntary commitment, creativity, and participation of the community at large. The City will educate stakeholders such as businesses, business groups, residents, developers, and property owners about the EECF and encourage participation in efforts to reduce GHG emissions in all possible sectors.

7.5 STEP 5—Green Fast Track Review

Tampa’s Green Fast Track Review process (described in Chapter 4) will play a key role in incentivizing new development projects as they include sustainable design features in the project. The Fast Track Review will be particularly critical in encouraging the implementation of the following reduction measures: energy efficient design features, renewable energy systems, electric landscaping infrastructure, and the telecommuting and alternative work schedules. These are in addition to the GHG-reducing features already included in the Fast Track Review checklist.

7.6 STEP 6—Monitoring and Inventorying

The City will create a system for monitoring the implementation of this EECF and adjusting the plan as opportunities arise. As the plan is implemented and as technology changes, the EECF should be revised to take advantage of new and emerging technology. If promising new strategies emerge, the City will evaluate how to incorporate these strategies into the EECF. Further, state and federal action will also result in changes which will influence the level of Tampa emissions.

The GHG inventory will be periodically updated in coordination with the three (3) phases noted above: 2015, to review progress after Phase 1 efforts; 2020, to review Phase 2 progress, allow for course

corrections to keep progress on target for 2025, and to develop post-2025 forecasts for use in planning for after 2025); and 2025 (to establish baseline for post-2025 GHG reduction planning). The City will also implement a monitoring and reporting program to evaluate the effectiveness of reduction measures with regards to progress towards meeting the goals of the EECp.

To provide periodic updates to the EECp inventory of GHG emissions, the City will use an Excel-based emissions inventory tool. This tool will include all the emission factors and emission sources specific to the City of Tampa. The tool will be designed such that City staff can input selected vehicle count, and the level of energy consumed in the City provided to them by the utilities, and the tool will quantify emissions for the City as a whole.

The CGO shall be responsible for maintaining records of reduction measure implementation and insuring that the periodic updates to the emissions inventory are completed using the Excel-based emissions inventory tool.

7.7 STEP 7—Beyond 2025

As described above under the discussion of Reduction Goals, 2025 is only a milestone in GHG reduction planning. Executive Order 07-127 calls for a reduction of GHG emissions to a level 80 percent below 1990 levels by 2050, and this level is consistent with the estimated reductions needed to stabilize atmospheric levels of CO₂ at 450 parts per million (ppm). Thus, there will be a need to start planning ahead for the post-2025 period.

However, there are many uncertainties in predicting emissions in post-2025. Federal programs and policies for the near term are likely to be well underway; market mechanisms like a cap and trade system may be in force and will be influencing energy and fuel prices; and continuing technological change in the fields of energy efficiency, alternative energy generation, vehicles, fuels, methane capture, and other areas will have occurred. In addition, by 2018, the City will be at the approximate midway point between plan implementation and the reduction target and after development of key ordinances and implementation of cost-effective measures. At that point, the City will have implemented the first phase of this EECp, will be well in to the second phase, and will have a better understanding of the effectiveness and efficiency of different reduction strategies and approaches. For all of these reasons, it is important that the City prepare and update the EECp for the post 2025 period toward the latter half of the EECp implementation period.

The City will then be able to take the local, regional, state, and federal context into account. The new plan will include a specific target for GHG reductions for 2035, 2040, and 2050. The targets will be consistent with broader state and federal reduction targets and with the scientific understanding of the needed reductions by 2050.

CHAPTER 8 **References**

- Association of Environmental Professionals (AEP) White Paper: Alternative Approaches to Analyzing Greenhouse Gases and Global Climate Change Impacts in CEQA Documents, June 2007.
- Association of Environmental Professionals (AEP) White Paper: Community-wide Greenhouse Gas Emission Protocols, November 2010.
- Center for Climate Strategies, Florida’s Energy and Climate Action Plan, 2008. [2008a]
- Center for Climate Strategies, Florida GHG Inventory and Reference Case Projection, October 2008. [2008b]
- Department of Environmental Protection (DEP), Chapter 62-285 Greenhouse Gas Reduction, 2009.
- Hillsborough County City-County Planning Commission (The Planning Commission), Hillsborough County Summary Totals, Population and Housing, 2010.
- Hillsborough County Metropolitan Planning Organization (MPO), 2035 Long Range Transportation Plan: LRTP Sustainability and GHG Reduction Strategies, April 2009.
- Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Scientific Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1, 2007
- Tampa, City of, Energy Efficiency and Conservation Strategy, June 19, 2009.
- Tampa, City of, Green Fast Track Review, 2008. [2008a]
- Tampa, City of, Green Resolution, May 15, 2008. [2008b]
- Tampa, City of, Green Tampa: Tracking Tampa’s Path to Sustainability, April 12, 2008. [2008c]
- Tampa, City of, Mayor’s Citizen/TECO Energy Conservation Task Force Final Recommendations, February 24, 2010. [2010a]
- Tampa, City of, Tampa Water Department FY10 Water Conservation Program Summary, 2010. [2010b]
- Tampa Bay Water, Greenhouse Gas Emissions Associated with Water Production, February 2, 2010.
- United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, December 11, 1997.
- U.S. Environmental Protection Agency (EPA), Emissions and Generation Resource Integrated Database (eGRID2007), version 1.1, December 31 2007. [2007a]
- U.S. Environmental Protection Agency, Final GHG Tailoring Rule, 40 CFR Parts 51, 52, 70, et al., May 2010. [2010a]

- U.S. Environmental Protection Agency, Mandatory Reporting of Greenhouse Gases Rule, 40 CFR Part 98, October 2009.
- U.S. Environmental Protection Agency, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, Third Edition, September 2006.
- U.S. Environmental Protection Agency, U.S. Greenhouse Gas Inventory Report, Section 6 Agriculture, <http://www.epa.gov/climatechange/emissions/downloads09/Agriculture.pdf>, accessed February 2010. [2010b]
- U.S. Supreme Court, Massachusetts et al. v. Environmental Protection Agency et al., No. 05-1120, Decided April 2, 2007. [2007b]

This page intentionally left blank.

APPENDIX A: THE GREENHOUSE EFFECT, GREENHOUSE GASES, AND CLIMATE CHANGE IMPACTS

APPENDIX B: MODELING COEFFICIENTS AND DATA ASSUMPTIONS

APPENDIX C: COMMUNITY-WIDE DATA INPUTS

APPENDIX D: MUNICIPAL INVENTORY GHG CALCULATIONS

APPENDIX E: COMMUNITY-WIDE INVENTORY GHG CALCULATIONS

APPENDIX F: REDUCTION MEASURES, ASSUMPTIONS AND ATTRIBUTED REDUCTIONS