# 2013

# Energy and Waste Reduction Report



Prepared by Suzanne Gooding Sustainability Project Manager Spring 2013



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### Note from the Director

The 2013 Energy and Waste Reduction Report is a compilation of the efforts of several departments to minimize risk of and reduce negative environmental impacts while providing exemplary service to the citizens of Wilmington. The Public Services department felt it necessary to collect and share this information with City leadership, staff and citizens to document and establish a baseline understanding of the City's efforts to date. This report documents the starting point of energy and waste reduction efforts and builds on those efforts bringing us to our current state.

The Public Services department recognizes energy as a controllable cost and will continually seek ways to manage environmental and economic resources in a sustainable manner. From interior and exterior lighting upgrades to route optimization projects, the city searches for ways to improve processes and equipment to minimize costs and maximize our long-term assurances to the citizens of Wilmington.

Waste reduction is a priority not only due to increasing disposal cost, but our commitment to minimizing environmental degradation in our city and region. The city's residential recycling program continues to grow with the advent of the new, blue recycling carts. Streets division systematically searches for ways to recycle the products used in daily operations. City offices and facilities are participating in recycling, reaching over 900 employees, and building on years of city-lead efforts to reduce waste.

As the Public Services department moves forward with energy and waste reduction initiatives, I am thankful for the efforts that lead us to this place and the determination of the employees who saw these efforts to fruition. The acknowledgement of the challenges certain in future energy and waste reduction efforts lead to an opportunity to leverage our past efforts and knowledge gained to create a culture of environmental stewardship.

Richard King Public Services Department Director City of Wilmington, NC

## Introduction

To Mayor Saffo, City Council and the citizens of the City of Wilmington,

The 2013 Energy and Waste Reduction Report reviews the City of Wilmington's past energy and waste reduction efforts. The efforts were the result of the commitment and actions of city leadership and staff working across departments to manage existing resources in a sustainable manner, ensure long-term stability and meet the needs of the citizenry. Energy and waste reduction efforts have grown over time as highlighted by the included timelines. Each department has contributed to the development and implementation of these projects and will continue to in the future. This report is a living document used to compile the city's efforts as well as to reflect and move forward. It is the intent of this document to be updated as the city explores additional opportunities in energy and waste reduction.

The city's current efforts include tracking and addressing internal energy use in a unified effort lead by the Public Services department. Additionally, a recycling education and outreach program has launched to further support the city's residential recycling program. The future outlook includes the creation of an internal sustainability committee charged with establishing reduction targets, creating strategies around those targets, implementing action steps and evaluating progress through an approved sustainability management plan. This committee will need the support of the City Council and leadership to fulfill its goals.

Suzanne Gooding Sustainability Project Manager City of Wilmington

### **Energy Initiatives**

#### **City Commitment**

In 2006, Mayor Saffo signed the U.S. Mayors Climate Protection Agreement, joining a national effort to reduce greenhouse gas emissions through a multitude of initiatives. By signing on to the U.S. Conference of Mayors Climate Protection Initiative, the city made a commitment to look for opportunities to improve operations and initiate programs to reduce greenhouse gas emissions (Appendix 1). From this effort, a resolution followed establishing a targeted greenhouse gas emission reduction goal (Appendix 2). City Council focused on municipal operation emissions and established a reduction target of 58% by the year 2050. In keeping with the principles of the U.S. Conference of Mayors Climate Protection Initiative, the Greenhouse Gas Emissions Reduction Resolution places increased importance on energy efficiency.

In 2008, the Public Services department, who holds responsibility for managing energy data, began outreach and educational efforts centered on energy conservation. These efforts included the addition of signage near lights and computers, an energy conservation competition among fire stations and inclusion of energy conservation information on the city's intranet.

The City Manager's office initiated a Fuel Conservation Directive in 2005, where city leadership established department based fuel efficiency and conservation strategies. Each department created strategies that fit their needs and the needs of the citizens they serve. The Fuel Conservation Directive was revised in 2011 in an effort to allow departments to update their fuel conservation strategies (Appendix 3).

In 2011, an alternative work schedule policy was approved with a slight emphasis on work space sharing. Although a small internal energy consumption reduction is possible with this policy, it does set the foundation for creative work space initiatives and resource conservation.

The IT department has been purchasing Energy Star computers to be used city-wide since 2002. They continue to support this effort.

#### **Public Services**

In 2009, the Solid Waste division conducted a large-scale route optimization project, realizing greater fuel and time efficiencies. The route optimization project allowed the development of an equitable workload for route drivers and improved customer service and production efficiencies.

The route optimization project resulted in cost savings, mainly due to crew reductions and fuel efficiencies. The reduction of 11 three-man crews to 9 three-man crews resulted in an approximate \$260,000 in staff position savings annually. The maps included highlight the Solid Waste routes before and after the route optimization project.



Routes prior to the optimization project (2009 and prior) Map source: Grace Morrison

The Stormwater division's storm sewer vacuum cleaning trucks are charged with cleaning storm drain pipes and structures in maintenance grid areas. Previously, the crews inspected grid areas while driving fuel inefficient vacuum trucks (4 to 6 mpg) while cleaning the system along the way. In an effort to conserve fuel through the 2005 Fuel Conservation Directive, the division altered their practice. Now, the crews performing the work utilize a smaller, more fuel efficient vehicle to inspect and plan their work. They pinpoint locations needing cleaning using the smaller vehicle, then use the vacuum trucks to perform the work at identified locations, eliminating fuel excesses and increasing workload efficiency. Overall, this effort reduces the mileage driven by the vacuum trucks and allows the crews to be more productive when cleaning.

The Public Services department houses the Facilities Maintenance division and is responsible for budgeting for and tracking energy use in buildings. In 2010, the City was awarded the Energy Efficiency Community Block Grant (EECBG) for over \$1M as a part of the American Recovery and Reinvestment Act of 2009 (ARRA), allowing the city to fund energy efficiency upgrades to several facilities. The project focus extended to energy and water consumption in city facilities. Several renewable energy projects were implemented including the addition of two photovoltaic arrays on the Fleet Maintenance and Engineering buildings at the Operations Center and a solar area light installed in the Municipal building parking lot. Energy efficiency improvements included lighting and occupancy sensor additions and upgrades throughout city-owned facilities and the installation of a white reflective roof on City Hall. Fans were installed in the Fleet Maintenance building in an effort to move heat from the ceiling heating units toward the workspace floor.



Fans installed in the Fleet Maintenance building as a part of the EECBG grant Photo Source: David Lallier

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Facility	Project
Fleet Maintenance	Solar PV array-73.92kW system produces annual net
	89,300 kWh
Engineering building	Solar PV array-26.88kW system produces annual net
	33,300 kWh
City Hall- Thalian Hall	White, reflective cool roof installation
Municipal building (305 Chestnut)	Pilot Solar Area Light in parking area
City-wide	Lighting upgrades and occupancy sensor installation
City-wide	Low-flow plumbing fixtures and water conservation
	upgrades
Fleet Maintenance	Fans installation to direct heat to workspace

#### City of Wilmington EECBG projects (2010-2012)

In 2009, the City built a new street sweeper complex designed for energy performance of net zero consumption over the annual cycle. It was constructed on property formerly housing the City's operations complex. The street sweeper complex incorporates passive solar, solar thermal, a solar photovoltaic array, and other energy efficiency features. The facility generates most of its own electricity and heat, while also feeding surplus power back to the electric grid claiming credits from the utility. In addition to the building's energy efficiency features, impervious surface and stormwater runoff impacts were significantly reduced with a bioretention unit adding stormwater treatment and green space. In 2009, the project was awarded the Significant Achievement Award from the Lower Cape Fear Stewardship Development Awards Program, a regional effort.



The City of Wilmington street sweeper complex, constructed in 2009, was built to net-zero energy consumption design standards Photo Source: Dave Mayes

In 2005, the Stormwater division installed a solar-powered aerator as a part of the Greenfield Lake management plan. The aerator runs at 80rpm during the day and reduces rpm levels at low light periods to continue operation. The aerator has a minimum 25-year life span, has the ability to be installed in remote locations and is mobile, making it ideal as a component of the management plan. The aerator was needed to improve dissolved oxygen as well as to manage the aquatic vegetation in the lake.

In 2010, the City of Wilmington was awarded a Local Energy Assurance Planning (LEAP) grant. This grant funded a Sustainability Manager position directed to develop an energy assurance report aligned with the State Energy Office's statewide energy assurance initiative. The report outlines current efforts in reducing energy assurance risks as well as future recommendations. It includes electricity, propane, natural gas and vehicle fuel recommendations and research.

The Convention Center was built to LEED Silver standards in 2010. The center has several features that reduce negative environmental impacts and save money in operating costs, including redevelopment of a former industrial railroad yard, innovative underground systems that uses sand to filter stormwater runoff before it goes into the Cape Fear River, a white roof that reflects the sun and reduces heat gain, water efficient landscaping, special glass that limits heating and cooling loss, plumbing fixtures that use about half the amount of water of traditional fixtures and efficient lighting and HVAC systems.

Along with LEED Silver Certification from the US Green Building Council, the Center received the Engineering Excellence Companies of NC. The Center received the award for the overall design of the site, which is specially designed to protect the riverfront ecosystem and minimize the environmental impact while also rehabilitating a former industrial site. (wilmingtonnc.gov)



The City of Wilmington's LEED Silver Convention Center Photo Source: Dylan Lee

In 2012, City Council authorized the installation of an Electric Vehicle charging station in the Market Street parking deck as a part of a wide spread data collection project named the Electric Vehicle Supply Equipment (EVSE) Load Progress Energy Research Project, lead by the local electric utility provider. Progress Energy will use the data collected to determine the impact of electric vehicles on the electric grid. The two-year project allows the utility to gather direct data on the Wilmington electric vehicle market while the city is able to offer electric vehicle charging in a city-owned parking deck. After the two year project ends, Progress Energy will transfer ownership of the electric vehicle charging station to the city.

In late 2012, the Public Services department hired Sustainability Project Manager to act as energy manager and support departmental efforts to reduce energy consumption by providing educational opportunities, research best practices and track the City's energy consumption.

The City's historic Kenan Fountain located at the intersection of Market St. and 5<sup>th</sup> St. will received a LED (lightemitting diode) lighting upgrade in early 2013 in response to a number of traffic accidents resulting in damage and expensive repair to the historic landmark. The LED upgrade is projected to result in improved visibility at this busy intersection.

#### Fleet Management

In 2010, the City's Fleet Maintenance division began evaluating vehicle needs and purchasing smaller, more efficient vehicles for replacements where feasible. The City replaced older less fuel-efficient vehicles with 17 hybrids and 3 electric vehicles by 2010. In 2013, the Fleet Maintenance division continues to investigate ways to position smaller, more fuel efficient vehicles into the fleet. Seven vehicles with V6 motors are being replaced with four-cylinder motors this year. The Fleet Manager continues to research ways to promote fuel efficiency and conservation.

Fleet management developed a no-idling policy through the Fuel Conservation Directive 2005, Revised 2011 (Appendix 3).



Fleet management uses Ultra Low Sulfur Diesel, phased in from 2006-2010 as a national standard, for fueling the diesel fleet, resulting in reduced overall emissions. Fleet Management currently uses E10 fuel, a blend of 10% ethanol and 90% gasoline, to fuel its gasoline fleet. E10 fuel can not only diversify the fuel blend but reduce carbon monoxide emissions. In 2013, Fleet Maintenance began adding an octane boost treatment to the bulk diesel orders to help provide cleaner more efficient burning engines. Fleet will begin to add a BG Fuel Service Treatment during preventative maintenance routines. Not only will this help with maintenance cost and repairs but it will increase fuel economy.

#### **Police Department**

The Wilmington Police Department installed a solar and grid-tied electric boat lift in June of 2012. The lift was chosen due to its potential use in remote areas or in times of emergencies or power outages.

### **Development Services**

The City's Traffic Engineering division began converting City traffic signals to LED lighting in the late nineties and completed the conversion of all traffic signals to energy efficient LED technology in 2005.

The Traffic Engineering division initiated a LED street lighting pilot in 2007, involving the installation of 13 energy efficient LED streetlights in downtown Wilmington. In late 2012, the City installed a LED street light at a busy intersection near the New Hanover Regional Medical Center in response to low visibility and pedestrian crossing concerns. The LED street light effort continues with the installation of LED street lighting in conjunction with the North Third Street Improvement project, a major capital improvement project completed in 2012, including replacing aging water and sewer infrastructure, moving utilities underground and improving a major gateway corridor into the city.



North Third Street Improvement Project featuring LED street lighting Photo Source: Dylan Lee





### **Waste Reduction Initiatives**

### Public Services, Solid Waste Management

The City of Wilmington began voluntary curb-side recycling collection in 1990. By 1994, the City was accepting recycling through single-stream collection, meaning recycling participants did not need to sort their recyclables. In 1995, the City's Solid Waste division began collecting recycling from city-owned offices and facilities on their regular collection routes. In FY 2011-2012, the City's internal efforts realized almost 100 tons of collected recycling items, averaging over 8 tons collected monthly from city-owned offices and facilities.

By 1997, a waste reduction need arose in response to the increase in the use of electronics in city offices and facilities. The City of Wilmington's Solid Waste division collects and disposes of used and broken electronics in order to recycle them properly. A majority of the computers, printers, battery back-ups and monitors are IT department assets. The Solid Waste division ensures these electronics and their subsequent hazardous materials are disposed of properly through the New Hanover County Hazardous Waste and Electronics program. Additionally, in the proposed FY2014 budget, the City's Solid Waste division requests to fund an expansion of services, offering electronics recycling through the City's bulk collection reaching City trash customers and a partnership with the landfill to ensure proper disposal of electronics.



By 2011, the Solid Waste division recognized a need to dispose of the City's broken trash and recycling containers and began recycling the containers, diverting this rigid plastic material from the landfill.

In 2012, the Solid Waste Management division rolled out the Big Blue recycling program, converting the voluntary recycling collection program from an 18-gallon bin to the option of utilizing a 95-gallon roll-out cart, allowing recycling participants

to increase their recycling efforts. From April 2012 to February 2013, recycling participation rates rose from 47% to 68%. The City also transitioned to a bi-weekly recycling collection schedule in an effort to reduce fuel consumption and staff time in early 2013.



Solid Waste employee collecting office recycling Photo Source: Pete Dowell

The City of Wilmington attained 35% reduction of solid waste materials through its recycling efforts in 2006, a reduction of 41% in 2012 and has established a reduction goal of 52% for 2015. The reduction goal includes recycling, bulky pick-up items and yard waste collection. From FY 2006-2012, the City collected over 30,000 tons of recycling items, diverting them from the landfill. The recycling tonnage numbers are expected to rise as educational efforts and convenience increase.

#### Public Services, Streets Division

The Public Services Streets division participates in paving recycling efforts including reusing and recycling asphalt millings as well as historic brick, cobblestone and granite reuse. Money and resources are preserved by continuing to assess ways to reduce the City's waste stream, namely offsetting landfill fees associated with its disposal. The historic brick, cobblestone and granite reuse efforts are needed in a city with rich, historic heritage and the community's commitment to historic preservation.



# Opportunities to expand focus areas and build on current strengths

The City's Public Services department will lead an internal committee focused on sustainable operations. This committee will guide the City's energy management and waste reduction efforts. The committee has the opportunity, once functioning, to develop and implement the city's first Sustainability Management Plan, building on the strengths described in this report to formally recognize the commitment to energy management and waste reduction.

As the city investigates ways to improve facility energy use in buildings, the opportunity to standardize and set policy defining expectations for occupant behavior will create a lasting impact in terms of energy use and waste reduction. The establishment of new construction standards for city-owned buildings will confirm the city's commitment to reducing energy and waste at the source and leading by example in the community. Additionally, policies around purchasing impact the city's energy consumption and waste reduction. Purchasing is decentralized in the city, but a centralized policy around energy efficiency and recycled products will have a large impact due to economies of scale.

Some cities have embraced opportunities to integrate energy and water conservation components into planned capital improvement projects through savings generated in energy and water conservation policies. Structuring this opportunity would involve a long-term commitment from a multi-departmental team.

As budgets are reduced or set at current levels, preventative maintenance schedules often suffer. There may be an opportunity to either budget staff specifically focusing on preventative maintenance for Fleet and Facility Maintenance operations or to set up maintenance contracts with private vendors to perform these tasks.

Additionally, the Public Service department has an opportunity to become the change agent in the city by implementing a sustainability goal in its departmental strategic plan. This goal and its supportive data will encourage the rest of the city divisions to integrate energy conservation into their long-term goals and daily operations.

# **Limitations of report**

The limitations of this report are housed in three main areas- data, topic focus area and internal vs. external focus. The data needed to measure the impact of these initiatives is in limited availability. To move forward with specific initiatives and measure their impact, data will need to be collected by individual divisions. The topic focus areas do not include all potential sustainability topics, namely urban canopy, brownsfield reclamation, the built environment, water quality, sea level rise, and the local food economy. The report's focus is on the internal operational impact of energy and waste reduction.

### **Appendixes**

**Appendix 1: US Mayors Climate Protection Agreement** 





#### The U.S. Mayors Climate Protection Agreement

(As endorsed by the 73<sup>rd</sup> Annual U.S. Conference of Mayors meeting, Chicago, 2005)

- A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
- B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that 1) includes clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and
- C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:
  - Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
  - Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
  - Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
  - Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
  - Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
  - 6. Purchase only Energy Star equipment and appliances for City use;
  - 7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
  - Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including antiidling messages; convert diesel vehicles to bio-diesel;
  - Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
  - 10. Increase recycling rates in City operations and in the community;
  - Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and
  - Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

#### Appendix 2: Resolution Establishing a Goal for Reducing Greenhouse Gas Emissions

Resolution



120111203

City Council City of Wilmington North Carolina

Introduced By: Sterling B. Cheatham, City Manager

Date: 10/20/2009

Resolution Establishing a Goal for Reducing Greenhouse Gas Emissions from Municipal Operations in Keeping with the Principles of the US **Conference of Mayors Climate Protection Initiative** 

#### **LEGISLATIVE INTENT/PURPOSE:**

In 2005, the United States Conference of Mayors unanimously adopted a Climate Protection Agreement to encourage cities to reduce their greenhouse gas emissions. On November 21, 2006 Council passed a resolution authorizing the Mayor to sign the US Conference of Mayors Climate Protection Agreement. To date, 999 cities from all fifty states, Puerto Rico, and Washington, DC representing a total population of nearly 86 million citizens - have joined Wilmington in endorsing the Agreement. The Mayors Council on Climate Protection was created to provide an opportunity for cities across the country to work together cooperatively to implement the activities specified in the US Conference of Mayors Climate Protection Agreement and to share information on best practices and successful city efforts.

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The City of Wilmington already has initiatives and plans in place that demonstrate a commitment to many of the areas outlined in the Agreement. One important and major step is to inventory municipal operations and establish a baseline of greenhouse gas emissions from which to set reduction targets. This inventory has been completed by Planning staff and a proposed target is established based on benchmarking other municipalities in North Carolina, the Southeast, and across the country.

#### THEREFORE, BE IT RESOLVED:

THAT the City Council hereby acknowledges and establishes a baseline measure of greenhouse gas emissions from municipal operations of an estimated 9,708 metric tons of carbon dioxide equivalents following the Local Government Operations Protocol established in 2008,

FURTHER BE IT RESOLVED THAT City Council establishes a goal for reduction of greenhouse gas emissions by 58% by the year 2050 in keeping with the 2006 resolution to endorse the US Conference of Mayors Climate Protection Initiative, and

FURTHER BE IT RESOLVED THAT City Council directs the City Manager to establish a protocol for tracking progress toward the goal on a regular basis and reporting back to City Council.

Bill Saffo, Mayor

Adopted at a regular meeti on October 20, 2009.

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Appendix 3: Fuel Conservation Directive, Revised 2011



Effective Date: 9/20/05 (Revised 9/8/11)

Subject: Fuel Conservation

Due to rising fuel prices, the City Government must take steps to reduce the consumption of fuel while continuing to provide basic governmental services. Under Level I measures, it is the goal of the Administration to continue to provide all basic services but in a manner that curtails the overall usage of fuel.

As the need to conserve fuel is enhanced to a secondary level, the Administration may undertake additional measures not noted herein, such as: modifying or suspending the take home vehicle program to reduce the number of vehicle miles driven, the suspending of less essential services and the closing of non-essential facilities.

Should the fuel problem rise to the national level, creating impacts on our employee's ability to purchase fuel, additional fuel saving measures will take place. Some departments have addressed this as a Level III measure.

Specifically and in response to rising fuel prices, the following shall be observed:

- Employees will be encouraged to conserve fuel whenever possible;
- Department heads are expected to consider alternative work schedules, including telecommunications, where appropriate
- Fleet Management will maintain a full supply of fuel;
- Alternative transportation will be promoted;
- Excess weight will be removed from City vehicles;
- Idling of vehicles will be kept to a minimum;
- All non-essential trips are eliminated
- Monthly reports on fuel usage will be provided for evaluation.

Also attached are individual departmental conservation measures that are related to this directive. Additional measures may be taken as the situation warrants.

Duration: Indefinite

Sterling B. Cheatham City Manager Prepared by Suzanne Gooding, Sustainability Project Manager Information provided by the following City Employees and resources

> **Richard King, Public Services Director** Laura Mortell, Business Administrator Dave Bundick, Solid Waste Superintendent Dave Mayes, Stormwater Manager Jay Carter, Streets Manager Donald McLamb, Facilities Manager Phil Prete, Environmental Planner John Fortuin, Fleet Manager Don Bennett, Traffic Engineering Manager Kathy Wilson, Client Services Manager Grace Morrison, GIS Analyst Lt. Ed Pigford, Wilmington Police Department Betty Gurganus, Parking Manager Adrienne Harrington, Transportation Planner Dylan Lee, GTV8 Station Manager City of Wilmington website (wilmingtonnc.gov)



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