

ENERGY STRATEGY IMPLEMENTATION

EECBG Allocation\$509,443

implementation of a city-wide environmental management software solution and the sub-metering of the Charlotte-Mecklenburg Government Center.

As a result of the successful grant implementation, the position of Energy & Sustainability Manager has grown to focus on all of the City's energy & environmental projects and provides guidance for the City of Charlotte as it lays the groundwork to become an energy and environmental leader.

Establishing the Energy and Sustainability Office

The City created the Energy and Sustainability Office to develop, implement and manage the EECBG program. The grant funded one position, the City's Energy & Sustainability Manager, and several projects. The Energy & Sustainability Manager provided the dedicated leadership needed to oversee and coordinate the grant. The manager was the primary contact on all EECBG matters, and interacted with staff at local, regional, state and national levels. The manager also coordinated the implementation of the EECBG strategy with the City Council adopted Environmental Focus Area Plan and with other City environmental programs. In addition to this work, the Energy & Sustainability Office funded several additional projects, such as the development and

CONCLUSION

Results of the EECBG projects demonstrate great success and have built the foundation for future environmental and energy initiatives for Charlotte. EECBG project managers and staff continue to implement projects and specific programs from the grant that were primarily catalyst projects. They include the electric vehicle program; energy efficiency in City buildings; neighborhood and commercial buildings program, and "thin client" use in City departments. Under the guidance of the Energy and Sustainability Manager, staff continues to evaluate emerging technologies designed to help the City continue to foster environmental goals and sustainable actions into the future.



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WE ALL HAVE IT IN US



Energy Efficiency and Conservation Block Grant

PROJECT SUMMARY

WELCOME

In 2009, the City began an impressive undertaking to develop an Energy Strategy, using a U.S. Department of Energy grant, which would focus not only on City facilities but on the Charlotte community. As Mayor, I recognize the importance of leading by example in our daily operations while looking for opportunities to collaborate with the community to address energy and environmental challenges. The 17 projects illustrated in this booklet represent the breadth of projects undertaken to improve Charlotte's quality of life and achieve the City Council's goal of becoming "a national leader in environmental sustainability, preserving our natural resources while balancing growth with sound fiscal policy." I hope you enjoy reading about Charlotte's successes and the great strides we are making in the areas of energy and the environment, as we meet the needs of our growing community.



Patrick D. Cannon
Mayor, Charlotte, North Carolina

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Charlotte Housing Authority Parktowne Terrace Retrofit

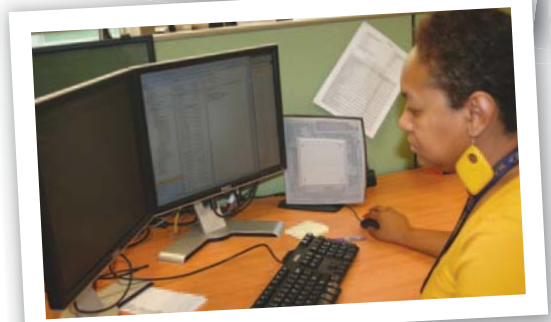
The City of Charlotte partnered with the Charlotte Housing Authority to provide new, energy efficient appliances to all 163 units in Parktowne Terrace as a part of their building's rehabilitation, which will result in the reduction of utility bills at the facility. Parktowne Terrace is now LEED Gold certified.

EECBG Allocation	\$204,124
Electric Ranges, Range Cords & Range Hoods ...	163
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Energy Efficient Computing

The City supports over 6,000 employees on digital devices on a daily basis. This project included testing, validating, and implementing the use of virtualized Personal Computers (PCs) for City employees to replace 500 desktop PCs with a smaller piece of hardware, called a "thin client." Corporate Information Technology staff also purchased servers to support the software. This technology uses up to 80% less energy than a standard PC workstation and enhances data security, as no information is stored locally on the thin clients. Thin clients have no moving parts and thus have lower maintenance costs and longer useful lives than traditional PCs.

PUBLIC BUILDING ENERGY EFFICIENCY IMPROVEMENTS



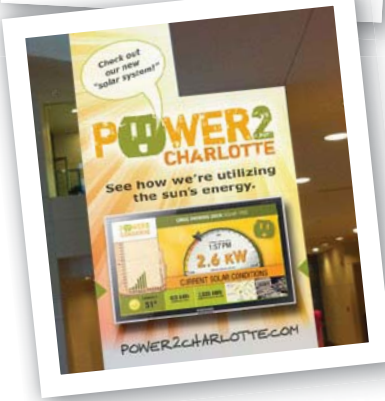
EECBG Allocation	\$359,177
Projected Energy Savings	1 million Kwh per Year in PC Energy Consumption

PUBLIC BUILDING ENERGY EFFICIENCY IMPROVEMENTS

EECBG Allocation \$174,072
 Energy Savings 51,351 KWh
 Cost Savings (1 year) \$3,302
 Energy Reduction Between
 Aug. 2011 and Aug. 2012 23%

Energy Efficient Lighting Replacement in CMGC Parking Deck

The CMGC Parking Deck provides parking for the Government Center employees and the public. EECBG upgrades included the installation of induction lighting fixtures, including additional fixtures to meet current photometric standards for parking lighting, while still reducing energy consumption. Since then, electric vehicle charging stations and a solar array have been added, resulting in quite the green parking deck.



The City leveraged North Carolina State Energy Office funds to install an 8 Kilowatt solar array on top of the CMGC parking deck roof. The amount of power produced currently offsets the electricity needed for the 6 electric vehicle charging stations in the deck.

The solar tree consists of forty individual solar panels. The framework is 33 feet by 22 feet, and weighs more than 5,000 pounds. The solar project is the first system owned and operated by the City of Charlotte. The solar kiosk is located in the lobby of the Charlotte-Mecklenburg Government Center. It provides real-time data on energy production and energy savings connected to the solar system. The kiosk also features information about other City solar projects and the latest news on Charlotte's energy initiatives.



EECBG Energy Efficiency and Conservation Block Grant

INTRODUCTION

In 2009, The U.S. Department of Energy (DOE) awarded the City of Charlotte a **\$6.78 million** Energy Efficiency and Conservation Block Grant (EECBG). The City utilized the initial **\$250,000** to develop the DOE-required Energy Strategy.

With the support of the Charlotte City Council and under the direction of the City's Energy and Sustainability Manager, project managers and staff coordinated with community partners and worked to develop and implement the energy strategy, which included 17 distinct projects.

COMMUNITY PARTNERS:



These 17 projects delivered energy savings, waste reduction, community improvements and much more. But the benefits of this grant don't stop here. The City also used this opportunity to create additional benefits that aren't easily measured with kilowatt hours saved or pounds of waste diverted from landfills. These include:

- The City of Charlotte leading by example,
- Generating catalyst projects that spur innovation and community engagement,
- Creating long-lasting partnerships with a broad range of organizations,
- Offering educational opportunities for Charlotte residents and City staff, and
- Improving the quality of life in the Charlotte region.

Although these benefits are hard to quantify, they are visible. Drive down South Boulevard and see a resident charging their electric vehicle or watch as other communities around the state and country look to Charlotte as a leader in improving the environment.

These 17 projects are just the beginning in bringing more... Power2Charlotte.

ENERGY STRATEGY DEVELOPMENT



Area residents joined elected officials and City staff at community meetings in the development of the City's Energy Strategy.

After a competitive selection process, the City selected Camp Dresser and McKee (CDM) to work with staff to develop the DOE-required Energy Strategy. A collaborative process, involving the public, City Council, City staff and the business community, collected and vetted project ideas. In total, there were 250 project ideas proposed.

CDM then prioritized the projects using a criteria ranking system based on the following concepts:

- > Improved air quality and greenhouse gas impact;
- > High potential to create or retain local jobs;
- > Potential to serve as a catalyst for additional progress;
- > Evidence of return on investment;
- > Ability to leverage additional public and/or private funding;
- > Implementation time frame of 1-3 years; and
- > Leadership and visibility potential.

This process resulted in a total of **17 projects to be included** in the Energy Strategy. These projects were categorized under six different categories, which are detailed in the following pages.

As part of the Energy Strategy development process, Camp Dresser & McKee teamed with EMG and Lime Energy to conduct energy audits of twelve public facilities. Their findings were the driving goals for the grant and matched the Department of Energy's stated purposes for the grant, some of which were:

- REDUCE GREENHOUSE GAS EMISSIONS
- LEVERAGE FUNDS FROM PUBLIC/PRIVATE SOURCES
- DEVELOP PROGRAMS/PROJECTS THAT CONTINUE BEYOND THE FUNDING PERIOD

Charlotte Mecklenburg Utilities Administrative Building Energy Improvements

Energy improvements to the Charlotte Mecklenburg Utility Department (CMUD) building were completed in spring 2012. Improvements included upgrading the chiller, boilers and motors, light fixtures and installing timers and occupancy sensors for equipment and lighting in low traffic areas of the building. As a result of the upgrades, indoor air quality and HVAC reliability have been greatly improved.

EECBG Allocation	\$870,848
Sq. Ft. of Retrofits Completed.....	37,800
Energy Savings.....	873,378 KWh
March, 2012 – October, 2013	
Cost Savings	\$64,800.38
March, 2012 – October, 2013	

Old City Hall Energy Improvements

Old City Hall, constructed in 1925, once housed the Charlotte Mayor and City Council before the Charlotte-Mecklenburg Government Center opened in 1988. The building now houses both the Neighborhood & Business Services and Community Relations departments. This project included replacement of HVAC equipment, controls and light fixtures within the facility with new energy efficient equipment and fixtures.

EECBG Allocation	\$492,191
Energy Savings.....	340,560 KWh
November, 2011 – October, 2013	
Cost Savings	\$7,600
November, 2011 – October, 2013	

PUBLIC BUILDING ENERGY EFFICIENCY IMPROVEMENTS



The HVAC system at the CMUD Brookshire Blvd. location received many energy efficient upgrades including replacement of the chiller and air-handling units.

AIR QUALITY SPECIFIC PROJECTS

EECBG Allocation \$80,504

Bicycle Master Plan: Wendover/Beal Street Intersection

The number-one ranked project in the city's Bicycle Master Plan, this project created a 10-foot wide concrete path that provides safe access to cyclists before the intersection of Beal Street and Wendover Road and provides a path to a signalized intersection at Wendover and Marvin Road. In addition, bicycle friendly ramps, signal call-buttons and marking were implemented as a part of this project.



Completion of Vehicular Wayfinding and Parking Variable Messaging Signage

The Charlotte Department of Transportation used the EECBG funding to complete the installation of an electronic messaging and wayfinding system at the entrances to the streets of Uptown Charlotte. This effort was matched with pedestrian wayfinding and dynamic parking signage in Center City Charlotte. Travelers are provided with "real time" parking availability and flexibility to support various venues and special event information. The City estimates that 75,000 gallons of gasoline will be saved per year.

EECBG Allocation \$294,297



Residential Energy Efficiency Improvements

EECBG Allocation \$525,037
 Total Square Feet of Retrofits 151,244
 Number of Home Retrofits 124
 Average Retrofit Grant \$4,200

The goal of this project was to reduce the energy consumption in low income homes in the City's revitalization areas. This project implemented energy efficiency & weatherization strategies by joining forces with the City's housing rehabilitation assistance program administered by Neighborhood and Business Services. The City contracted with three local non-profits: *Habitat for Humanity*; *Goodwill of Southern Piedmont*; and *Builders of Hope* to implement these strategies:

- > Insulation repair
- > Duct sealing
- > Home envelope sealing
- > HVAC repair and replacement

This provided local jobs and allowed for these three entities to work on developing a green workforce.

ENERGY INVESTMENTS IN REVITALIZATION AREAS



A Plaza-Midwood home is made more energy efficient thanks to an energy audit and repairs made as part of the Neighborhood Energy Challenge.

ENERGY INVESTMENTS IN REVITALIZATION AREAS

Commercial Building and Energy Retrofit Program

The goals of the Commercial Building and Energy Retrofit Program were multifaceted. It was designed to create job and training opportunities, increase energy efficiency of existing structures by 15% or greater, expand housing options by improving the energy efficiency of existing communities, and promote sustainable behaviors.

In addition to funding retrofits, the program also provided contractor training, including Building Performance Institute certification through partnerships with CPCC and Advanced Energy.

EECBG Allocation	\$962,481.54
Number of Apts. Retrofitted	1311
Total Square Feet of Retrofits	278,711
Average Retrofit Grant	\$44,529
Leveraged Private Funds ...	\$8.46 Million

Education and Outreach Campaigns

The Outreach and Education Campaign is responsible for educating and engaging the public on the City's 17 block grant projects, along with energy efficiency and sustainability. Launched as the Power2Charlotte campaign, the program offers resources and services to help Charlotte residents, business owners and the community at large to be more energy efficient and environmentally conscious. The citywide program promotes and encourages increased conservation and the use of clean, renewable energy. It also provides citizens with information so they can make better decisions that will reduce the overall energy consumption in our community. The centerpiece of the campaign is an interactive website, Power2Charlotte.com that showcases all 17 of the EECBG projects in addition to serving as an ongoing resource for other energy partners and future projects. The website creates a dynamic environment to distribute interactive content and provide a vehicle for dialog between the City, project experts, interested citizens and the media.

Another key element of the campaign was a monthly eNewsletter which provided regular updates on the progress of projects throughout the community.

The website featured an easy registration form for those interested in learning more about what the City is doing and what they, as residents and business owners, can do to make a difference.

CATALYST PROJECTS

EECBG Allocation	\$236,487
Number of People Reached with Campaigns Throughout the Grant Period	7,664,192*

Strategies used to promote Power2Charlotte included:

- > Billboards
- > CATS bus advertising
- > Lynx Light Rail advertising
- > City employee newsletters
- > Power2 Charlotte bracelets, flyers and promotional items
- > Graphics on the City's electric vehicle fleet
- > Public education presentations
- > Community events
- > Signage on streets and at charging stations
- > Car dealership partnerships
- > Media coverage



Belvedere Theater After: The building was completely re-purposed and retrofitted into an energy efficient dentist office with a white membrane roof that reflects sunlight, a tankless water system and high efficiency windows. Sub-recipient Dest Dental, received a \$63,000 grant from the Commercial Building Retrofit Program. Dest paid for dental equipment, including X-ray machines. This project leveraged \$1.5 Million of private funds from Dest Dental Management.



*Number is based on impressions estimated through various means of advertising, community events, media coverage, electronic newsletters, and other promotional strategies used throughout the grant period.

CATALYST PROJECTS

EECBG Allocation \$126,000
 Energy Savings..... 9,000 KWh
 Cost Savings \$1,200



Charging station on roof of Discovery Place Deck: The charging station at Discovery Place is fueled by the electricity generated by the facility's photovoltaic system.

Discovery Place Photovoltaic System

The City of Charlotte provided sub-grant funding for the installation of a solar array mounted on top of the Discovery Place Parking Deck in Uptown Charlotte. The project maximizes the use of commercially available photovoltaic system components to demonstrate leadership and serves as a model for similar projects within the community. The sub-grant also provided funding for an electric vehicle charging station and an educational kiosk. The solar tree generates energy for the electric vehicle charging station that is located in the parking deck, and enables the Discovery Place building to conserve energy.



Solar Kiosk: The educational kiosk was installed inside Discovery Place. The kiosk describes the uses of solar energy and even has a spot for kids to peek up at the panels above.

NEIGHBORHOOD ENERGY CHALLENGE

The Neighborhood Energy Challenge (NEC) encouraged neighborhood involvement in planning and implementing energy solutions. Components included education, implementation of community led sustainability projects and energy efficiency improvements through the Household Energy Fund (HEF). Applicants created a neighborhood sustainability strategy and a Neighborhood Energy Efficiency Team. Participants were selected through a competitive evaluation process.

Participating neighborhoods received \$20,000 each for project implementation and energy efficiency improvements through the HEF. Projects included distribution of energy efficient products, customized bicycle parking improvements, a film screening, appliance replacement, seminars, and lighting upgrades including a LED holiday display.

EECBG Allocation \$849,568
 Neighborhoods Participating 14
 Number of Home Retrofits 317
 Total Square Feet of Retrofits 437,350
 Energy Efficiency Kits Distributed 1,150

Power2 Live Green

Born out of the NEC, the program provided up to \$10,000 for improvements in six categories, including efficient home improvements, alternative transportation and energy efficient product distribution.

Participants were required to establish a Neighborhood Energy Efficiency Team, participate in a community clean-up and create a Sustainable Vision that included goals and strategies for future sustainability.



A Plaza-Midwood home is made more energy efficient thanks to an energy audit and repairs made as part of the Neighborhood Energy Challenge.

Household Energy Fund

Participants in the NEC also received up to \$60,000 per neighborhood for energy efficiency improvements through the HEF, which hired local vendors to install energy efficiency measures to improve building efficiency and prevent energy loss. Services included blower-door and combustion safety testing, attic insulation, air sealing, and duct sealing. Homes were chosen at random through an application process.

CATALYST PROJECTS

Electric Vehicles and Charging Stations

The City's electric vehicle and charging station project is part of a larger initiative to make Charlotte more electric vehicle friendly. This was developed as a pilot project to determine the practicality of electric vehicles for Charlotte's fleet and gauge public use and demand for electric vehicle charging stations. The project included the purchase of 11 plug-in electric vehicles for the City's fleet and the installation of 29 electric vehicle charging stations free for public use at 7 locations around the City. EECBG funds were used to cover the incremental costs of the two Chevrolet Volts, eight Nissan Leafs and one Ford C-Max, which are now part of the City's fleet.

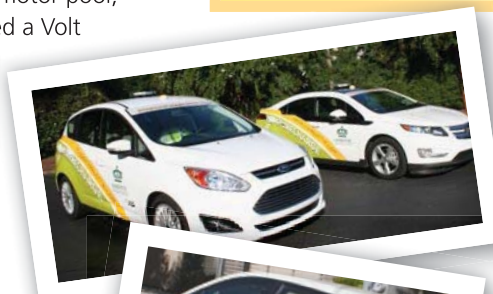
EECBG Allocation	\$404,411
Number of Vehicles Purchased	11
Number of Charging Stations Installed	29

The Chevrolet Volt is a plug-in electric vehicle with 38 mile range on battery power and gas back-up. In addition to adding a Volt to the City motor pool, Solid Waste Services added a Volt to their department fleet.

The Nissan Leaf is a 100% electric vehicle with 99 mile range on electric power.

The Ford C-Max is a plug-in hybrid vehicle which runs on both electric and gas motors.

The City partnered with area Chevrolet and Nissan Dealerships to foster the relationship between clean energy and the City's policies. Additionally, there was a major launch of the electric vehicle program in March of 2012.



Duke Energy, Wells Fargo, and Bank of America committed to installing approximately 18 publicly accessible stations, which are also free to the public.



I-485 Park & Ride Energy Efficiency Lighting Pilot

Installed in June 2011, the project replaced lighting at the LYNX I-485 Station Park and Ride facilities with higher efficiency fixtures in the deck (360 induction lights) and surface lot (41 LED pole-mounted lights). The retrofit resulted in an approximate 50% reduction in costs from September 2010 to September 2011. Total energy consumption went from a 61,680 KW monthly average in September 2010 to a 30,760 KW monthly average in September 2011.

EECBG Allocation	\$242,278
Number of Lights	401
Sq. Ft. of Retrofits	1,200
Average Annual Energy Savings ..	318,240 KWH
Average Annual Cost Savings	\$12,222.69

Center City On-Street Recycling

The City partnered with Charlotte Center City Partners to bring Center City its first public recycling program, targeting pedestrians who live, work and visit the urban core.

Initially 35 recycling receptacles were installed. Funds also purchased an electric vehicle designed for use by Solid Waste Services to service the bins. 45 more bins were added later thanks to a partnership donation from Re-Community. Duke Energy donated 3 Big Belly solar compacting waste stations. In addition, \$15,000 in EECBG funds were allocated to provide recycling receptacles at Lynx light rail stations.

EECBG Allocation	\$154, 891
Bins Installed from Funds	35
Electric Service Vehicle Purchased from Funds	1
Bins Donated	48
Amount of Waste Diverted	11 tons per year

CATALYST PROJECTS

