MEET THE CHALLENGE. BUILD THE FUTURE.

CITY OF AUGUSTA-RICHMOND COUNTY

ENERGY EFFICIENCY AND CONSERVATION STRATEGY

2.2011

SUBMITTED BY Shaw® Shaw Environmental & Infrastructure, Inc.

Augusta
GEORGIA

CONTENTS

Augusta adjacent to Camp Hancock, 1918
© Library of Congress, Isaac Shulman, 1918

We must look to the future.

-Winston S. Churchill, September 19, 1946

vision

PROCESS

The City of Augusta-Richmond County is dedicated to enhancing the quality of life of its residents and businesses, and recognizes that increasing trends in energy usage and costs have a significant impact on the environment, as well as on the economic health and social integrity of its residents. Due to ever-increasing energy usage and costs among other issues, Augusta is facing a challenge in providing the quality of services desired by the community while maintaining its financial good standing and protecting environmental resources.

Augusta has demonstrated leadership in implementing programs to reduce fossil fuel consumption and greenhouse gas emissions. Initiatives implemented over the years include capturing methane gas generated at the solid waste landfill for beneficial reuse at a kaolin plant nearby. Additionally, Augusta's Information Technology (IT) Department has formed the Living Green Committee charged with reducing energy usage from the City's IT operations. Building on these past and current practices, Augusta has prepared the Energy Efficiency and Conservation Strategy, a planning document that identifies specific energy efficiency and conservation goals and objectives and ways the City envisions achieving these goals.

The Strategy was developed under the federal program Energy Efficiency and Conservation Block Grant (EECBG). In August 2009 Augusta received a grant of $1,969,900 from the U.S. Department of Energy under the EECBG program to develop and implement projects and other initiatives that reduce total energy use and greenhouse gas emissions, and that stimulate the economy by creating and retaining jobs.

Augusta has retained the services of Shaw Environmental & Infrastructure, Inc. (Shaw) to facilitate the development of its Energy Efficiency and Conservation Strategy. Shaw helped the City assess baseline energy and greenhouse gas emissions, identify opportunities to reduce energy consumption and greenhouse gas emissions, and identify available resources to fund candidate projects.

To initiate its activities, Augusta assembled an Energy Efficiency and Conservation Strategy Development Team (Team) tasked with planning and developing the Strategy. The Team selected a Steering Committee which has direct authority for preparing, amending and implementing the Strategy. The Steering Committee meets regularly to discuss the progress of the Strategy; it is chaired by the Director of Planning and Zoning and composed of staff from the following City departments or agencies:

- Planning and Zoning
- Public Services
- Parks and Recreation
- Engineering
- Solid Waste

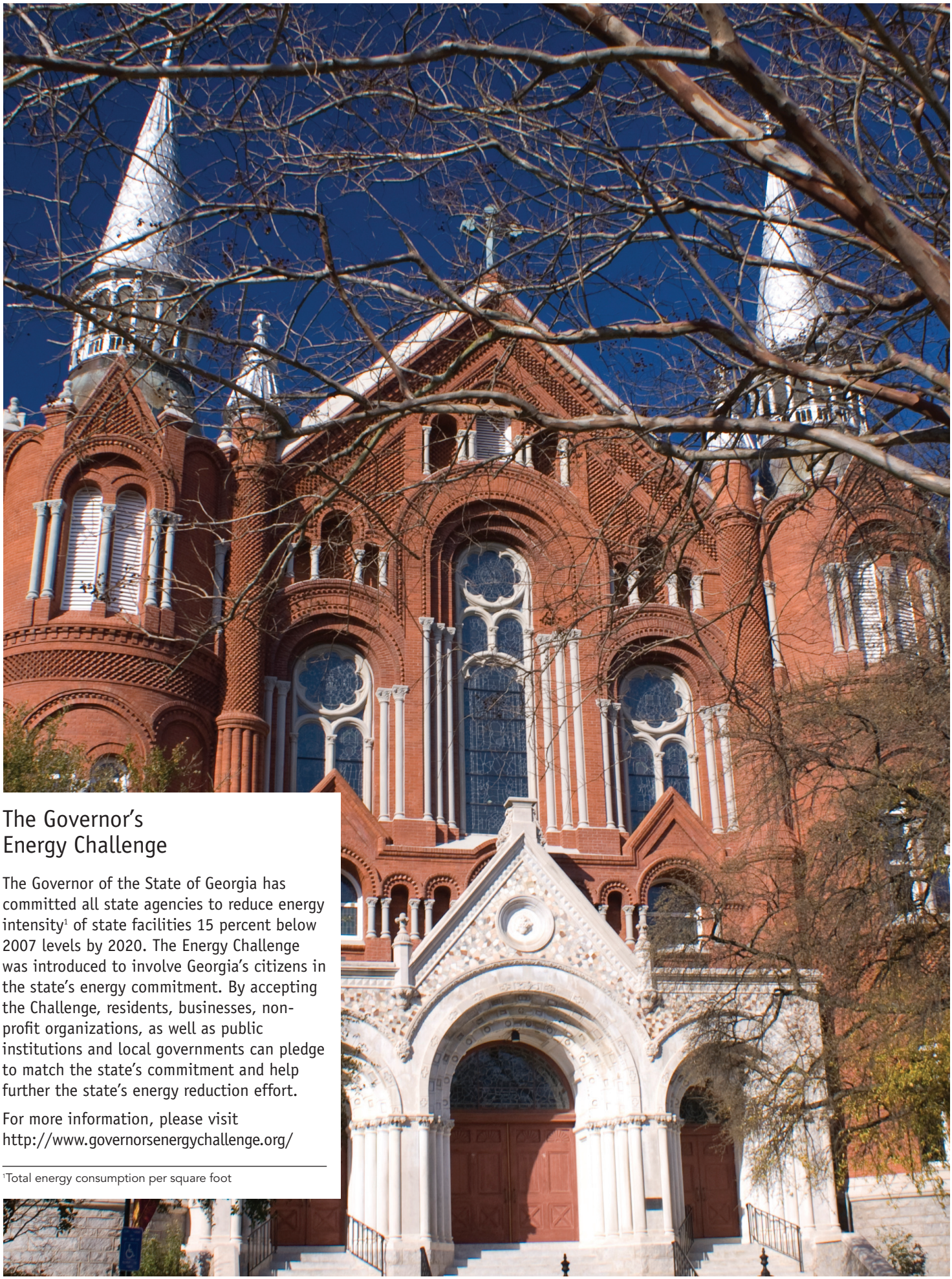
Representatives of other City departments or agencies provided further advisory during the development of the Strategy. The Team held a public meeting on December 3, 2009 to present and discuss the proposed Strategy and to obtain input from the public.

did you know?

Whereas energy efficiency is using less energy to provide the same level of service, energy conservation entails a behavioral change.

As the City moves forward with its Energy Efficiency and Conservation Strategy, additional stakeholders, private and public, will be involved in the implementation process.

To find out how you can contribute to achieve the goals of Augusta's Strategy, please visit our website at http://www.augustaga.gov/.



The Governor's Energy Challenge

The Governor of the State of Georgia has committed all state agencies to reduce energy intensity[1] of state facilities 15 percent below 2007 levels by 2020. The Energy Challenge was introduced to involve Georgia's citizens in the state's energy commitment. By accepting the Challenge, residents, businesses, non-profit organizations, as well as public institutions and local governments can pledge to match the state's commitment and help further the state's energy reduction effort.

For more information, please visit http://www.governorsenergychallenge.org/

[1]Total energy consumption per square foot

Church of the Sacred Heart, 1905
© Library of Congress, Detroit Publishing Company, 1880-1920

GOALS AND OBJECTIVES

The Steering Committee, in consultation with various stakeholders, developed the goals and objectives of Augusta's Energy Efficiency and Conservation Strategy. The intention of the Strategy is to define what actions the City of Augusta can take to meet distinct energy efficiency goals that will result in reduced total energy use and associated operating costs, reduced greenhouse gas emissions, creation of jobs, and overall quality of life improvement for its residents.

The Steering Committee identified major energy sectors to focus its energy efficiency and conservation efforts, including municipal-owned buildings and facilities, and transportation. An Energy Efficiency and Conservation Strategy that addresses these sectors will provide community-wide benefits including lower overall energy consumption, and greenhouse gas emissions reduction. The Strategy will also help Augusta make decisions that benefit the environment and the economy, in a manner that promotes social fairness to its residents. A balanced nourishment of these three interlinked elements – Environment, Economy and Society – is the key to a sustainable future.

Demonstrating its commitment to energy reduction and conservation, the City of Augusta intends to accept the Governor's Energy Challenge (see sidebar on page 6), and has adopted a goal of reducing total energy consumption in municipal buildings and assets by 15 percent from calendar year 2007 by 2020.

In addition, Augusta has set specific goals to reduce energy in the transportation sector. The vast majority of residents in Augusta commute to work in a conventional single-occupant vehicle, while only one percent of the population uses public transportation. Consequently, traffic congestion in the main arterials and highways in Augusta is a major distress to the residents for several reasons including traffic delays, high fuel consumption and costs, and environmental harm.

To address the increasing energy issues and to stimulate a new demand for green jobs and services, Augusta aims to reduce energy consumption and diversify its energy supply with the use of renewable energy resources. For its Strategy, Augusta has identified the following specific goals:

- Reduce total energy consumption of county-owned buildings and assets by 15 percent from 2007 levels by 2020
- Reduce electrical energy usage associated with traffic lights by 50 percent from 2007 levels by calendar year 2015
- Reduce fossil fuel consumption by reducing the number of principal arterials that have a Level-of-Service (LOS) ranking of C or less to no more than 10 percent[2]
- Evaluate the use of technologies that use renewable energy resources
- Reduce overall operating costs for the City
- Create new jobs
- Lead by Example

Achieving these goals can bring the City a step closer to offering its residents *"…a clean, safe place to live, work, and play with a diverse economy, abundant job opportunities, a variety of entertainment and recreation opportunities and a development pattern that is attractive to both residents and visitors."* (City of Augusta-Richmond County Vision Statement)

[2]Level of Service (LOS) is the measurement used to identify traffic congestion levels. The LOS system uses letters A through F to rank a given road, with A being the best and F the worst ranking.

Hampton Terrace Hotel, 1900-1906
© Library of Congress, Detroit Publishing Company, 1880-1920

IMPLEMENTATION

To initiate the effort toward its Energy Efficiency and Conservation Strategy, Augusta is leveraging the funds allocated by the U.S. Department of Energy through the EECBG program to focus on measures that reduce total energy consumption and greenhouse gas emissions associated with municipal buildings and facilities, and transportation. Augusta wishes to maximize the benefits obtained under the EECBG program, and will pursue additional grants and other funds to undertake additional actions described in the Strategy.

Augusta identified four major strategies to achieve its energy efficiency and conservation goals.

STRATEGY ONE
ENERGY EFFICIENT BUILDINGS AND FACILITIES

To achieve the goal of reducing total energy consumption in county-owned buildings, Augusta conducted energy audits at selected municipal buildings and facilities to identify potential energy efficiency measures and improvements, and thereby implement retrofits and upgrades. Energy audits will be conducted for those facilities whose operations contribute to more than 5 percent of the total energy consumption. Selected retrofits will be implemented according to the City's availability of capital funds. Energy savings will be used to fund additional retrofit projects.

To spearhead its initiatives, Augusta will benchmark its current energy consumption and greenhouse gas emissions against the baseline year 2007 consistently with the Energy Challenge baseline year. Preliminary benchmarking revealed that, to achieve its goal, the City should reduce energy consumption at county-owned buildings by at least 10,000 MWh in electricity by 2020, equivalent to taking 1,373 cars off the road. Augusta will establish an energy management system to track energy usage and greenhouse gas emissions across its portfolio of buildings and facilities. Energy management will help the City identify underperforming buildings, monitor energy improvements over time, and will help track the City's performance against its Governor's Energy Challenge goal.

STRATEGY TWO
IMPROVED TRANSPORTATION

Augusta plans to achieve its goal of reducing vehicular fuel consumption by reducing traffic congestion and idling in most critical roadways and intersections. Solutions proposed to reduce the number of automobiles on the road include encouraging alternate modes of transportation and the use of public transportation, telecommuting, flexible work schedules and carpooling, as well as introducing non-idling policies for trucks and buses. These initiatives can reduce the number of single-occupant automobiles on the roadways, and reduce overall fuel consumption. Additionally, Augusta intends to synchronize traffic signals at major intersections to speed up traffic and decrease idling based on real traffic condition, rather than on a timer. Community-wide reductions in fossil fuel usage will occur from the implementation of transportation improvement projects.

Additionally, Augusta intends to upgrade selected traffic lights and streetlights with LED-based advanced technologies for outdoor lighting. A change to more efficient LED lighting technology can reduce electrical energy consumption by up to 80% from incandescent lights. Augusta has set a goal of reducing electrical energy usage associated with traffic lights by 50 percent from 2007 levels by calendar year 2015. The installation of LED lights in all county traffic signals will help the City meet this goal. Operational cost savings accruing from implementation of the project will fund additional lighting improvements or other projects identified by the Steering Committee. Augusta plans to install LED traffic lights at 71 intersections, using funds from its EECBG allocation.

STRATEGY THREE
RENEWABLE ENERGY

Augusta intends to incorporate renewable energy resources into county-owned facilities and operations to reduce overall operating costs and recover energy that would otherwise go to waste. By implementing renewable energy systems at City facilities, Augusta will also stimulate the creation of green jobs and will demonstrate its commitment to a more sustainable future.

To better harvest available resources, Augusta will evaluate ways to recover methane gas generated by processes at the municipal landfill and at the wastewater treatment facility. Potential use of solar energy at county-owned facilities will also be evaluated, including the feasibility of solar photovoltaic systems at the landfill and at Recreation & Parks facilities.

STRATEGY FOUR
SUSTAINABLE POLICY, EDUCATION AND OUTREACH

Augusta proposes a two-fold approach to educate and encourage the public to conserve and use energy more efficiently. First, the City plans to establish an educational campaign on energy efficiency and conservation for both City employees and individuals in the community, including the institution of an "Energy Efficiency and Conservation Month", and release of energy conservation tips through Augusta's existing and new delivery channels such as the City's website, newsletters, public meetings and other initiatives. Augusta may also seek new or established partnerships to reach out to the larger community.

Secondly, Augusta will review its existing code of ordinances to find opportunities for regulatory changes that may lead to energy efficiency. Changes may include upgrading to more stringent energy code, and introducing voluntary programs to encourage energy efficiency and conservation. These two approaches will work together to effectively involve and lead the community to an energy-conscious future.

REGIONAL COORDINATION

Intergovernmental coordination is very important to Augusta. Over the years, intergovernmental coordination has involved various activities such as working with neighboring communities and Fort Gordon on projects of mutual interest, participating in intergovernmental forums and programs, and assessing the potential impact of projects on adjacent communities.

Augusta participates in a wide variety of regional planning activities related to transportation, economic development, water quality, land use and other issues. The City has been a part of the Augusta Regional Transportation Study since its inception in the mid-1960s, and is a long-time member of the Central Savannah River Area (CSRA) Regional Development Center, the CSRA Unified Development Council and the CSRA Unified Development Authority.

The Steering Committee is coordinating with neighboring municipalities and counties, including Fort Gordon, Columbia County in Georgia and Aiken County in South Carolina to implement a comprehensive, unified strategy in this region.

did you know?

Augusta participates in a number of organizations and initiatives that promote and plan for regional economic development, transportation, tourism, historic preservation and natural resource protection, including the Augusta Regional Transportation Study, Augusta Tomorrow, and the Greenspace Program.

STRUCTURE

Augusta's four strategies include 23 actions that the City plans to undertake to support energy efficiency and conservation throughout the community. This report discusses how each action contributes to the City's goals, and includes a description of the estimated timeframe for implementation, and quantifiable implementation costs, estimated energy savings, and reduction in greenhouse gas emissions.

STRATEGY ONE **ENERGY EFFICIENT BUILDINGS AND FACILITIES**	1. Replace HVAC Systems at the Julian Smith Casino (*) 2. Replace Air Conditioning Units at the Aquatic Center 3. Upgrade Mechanical Systems at the Municipal Building 4. Tie HVAC Systems into the Municipal Building Central Plant 5. Upgrade HVAC Units throughout County Buildings 6. Implement Lighting Retrofit Projects 7. Install Occupancy Sensors on Vending Machines 8. Take the Governor's Energy Challenge 9. Manage energy and water use with Portfolio Manager 10. Prepare a City-wide Greenhouse Gas Inventory
STRATEGY TWO **IMPROVED TRANSPORTATION**	11. Install LED Traffic Signals (*) 12. Install Adaptive Traffic Signal Systems (*) 13. Upgrade Municipal Fleet 14. Promote Alternative Transportation
STRATEGY THREE **RENEWABLE ENERGY**	15. Implement Gas Recovery Project at the Messerly Water Pollution Control Plant 16. Implement Gas Recovery Project at Landfill 17. Install a Solar Cap on Landfill 18. Design a Reclaimed Water Infrastructure
STRATEGY FOUR **SUSTAINABLE POLICY, EDUCATION AND OUTREACH**	19. Review and Revise Code of Ordinances 20. Implement Green Cleaning Policy & Procedures 21. Establish a Recycling Program 22. Implement Green Printing Practices 23. Launch a Public Outreach Program NOTE: (*) Funded by the EECBG Program

Implementing these strategies will result in several environmental, economic and social benefits, some of which are identified below. Pie charts in the front page of each Strategy depict the breakdown of the benefits within each category. Percentages were calculated by assigning one point for every benefit resulting from the implementation of a given action.

ENVIRONMENT	ECONOMY	SOCIETY
ENERGY REDUCTION	COST SAVINGS	PUBLIC EDUCATION
CLEANER AIR	GREEN ECONOMY	SAFETY
LAND PRESERVATION	RESOURCE LEVERAGE	AFFORDABILITY
WATER CONSERVATION	QUALITY OF SERVICES	JOB OPPORTUNITIES
WASTE REDUCTION	LEAD BY EXAMPLE	QUALITY OF LIFE

A key tool developed with this Strategy is the *Project Activity Matrix*, a summary table showing projected fossil fuel savings, electrical energy savings, and greenhouse gas reductions obtained from implementation of various proposed actions. The Project Activity Matrix was developed by soliciting input from the public and from brain storming sessions held with the Steering Committee. The Project Activity Matrix also serves to monitor the progress of the projects in meeting the City's Strategy goals, and is presented in Appendix A.

The following funding resources or programs may provide supplemental funding for implementation of Augusta's Strategy:

- *Large Urban Cities Program* administered by the Federal Transit Administration
- *Renewable Energy Production Incentive* administered by the Department of Energy
- *Landfill Methane Outreach Program* administered by the U.S. Environmental Protection Agency

A comprehensive inventory of funding resources that Augusta may use in support of additional activities is presented in the Resource Inventory in Appendix B. Additionally, Augusta plans to use a portion of the operating savings accrued from energy improvements to fund other energy improvement projects.

Augusta has requested funding from the U.S. Department of Energy's EECBG program for the following projects:

- Development of the Energy Efficiency and Conservation Strategy
- Replacement of the HVAC system at Julian Smith Casino
- Replacement of 20 HVAC units at various county buildings
- Connection of 8 HVAC units into the Main Building central plant
- Conversion of 71 intersection traffic lights to LED traffic lights
- Installation of adaptive traffic signals at 25 intersections

Additional projects were identified for further evaluation or potential implementation. Implementation of the Strategy will generate electrical savings of at least 1,330 MWh and 283,667 gallons of gasoline fuel savings, saving at least 3,477 Mt of CO_2 eq, equivalent to 665 cars off the road.

TIMELINE

Augusta has identified a timeframe for implementation of its Strategy as a starting point for longer term activities.

Phase 1 (August 2009 through December 2009): Establish Steering Committee to provide program guidance; consult with stakeholders on plan elements; identify goals of Strategy and identify potential projects.

Phase 2 (January 2010 through February 2011): Finalize projects, obtain necessary bids, select vendors and contractors. Develop greenhouse gas inventory and baseline energy usage. Establish monitoring, record keeping and reporting.

Phase 3 (March 2011 through August 2012): Continue program implementation; conduct necessary monitoring and record keeping. Review and update Strategy if necessary. Prepare report on progress and completion of EECBG implementation.

Phase 4 (Post August 2012) Maintain programs for the long-term. Implement long-term projects.

strategy one

ENERGY EFFICIENT BUILDINGS AND FACILITIES

Strategy One is focused on improving the energy performance of Augusta's buildings and facilities, resulting in reduction of greenhouse gas emissions and in energy cost savings. Reduced energy cost, potential leverage of financial incentives, and new job opportunities for the local workforce, will make Augusta a more affordable place to live.

goals

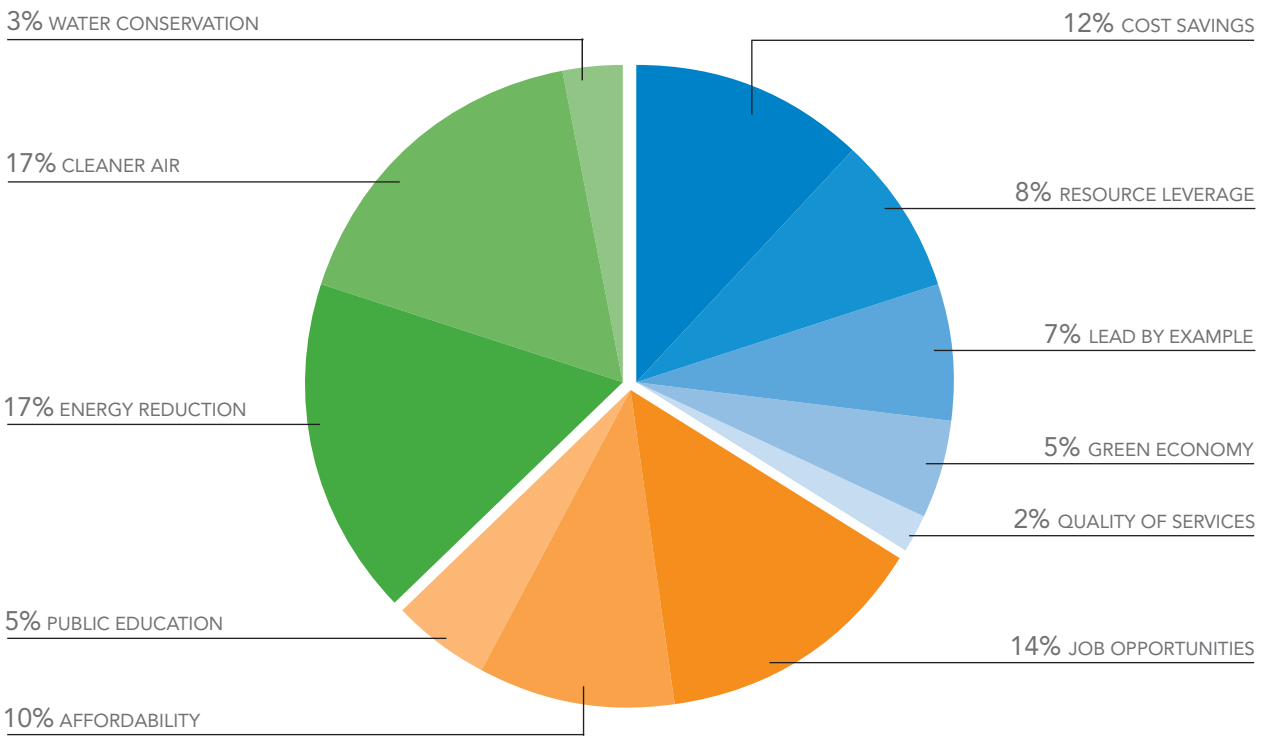
- Reduce total energy consumption
- Reduce overall operating costs
- Create new jobs

actions

1. Replace HVAC Systems at the Julian Smith Casino (*)
2. Replace Air Conditioning Units at the Aquatic Center
3. Upgrade Mechanical Systems at the Municipal Building
4. Tie HVAC systems into the Municipal Building Central Plant (*)
5. Upgrade HVAC units throughout County Buildings (*)
6. Implement Lighting Retrofit Projects
7. Install Occupancy Sensors on Vending Machines
8. Take the Governor's Energy Challenge
9. Manage energy and water use with Portfolio Manager
10. Prepare a City-wide Greenhouse Gas Inventory

(*) partially funded by the EECBG Program

benefits: environment / economy / society




JULIAN SMITH CASINO


© Amber Rhea via FLICKR

1 REPLACE HVAC SYSTEM AT JULIAN SMITH CASINO

BUDGET: **$366,361 (*)**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **47,651 kWh**

ANNUAL ENERGY COST SAVINGS: **$5,242/YEAR**

CARS OFF THE ROAD:

Built in 1939, the Julian Smith Casino at Lake Olmstead Park is one of the region's premier rental facilities. Many events, such as training/educational opportunities, special events, or civic events to name a few, draw users and patrons from throughout the Central Savannah River Area (CSRA).

1a HVAC EQUIPMENT AND DUCTWORK

With more than 20 years of age, the HVAC system installed in the facility is past the end of its economic life. Furthermore, the system is inefficient and some components are no longer code-compliant. The replacement of the HVAC equipment and ductwork will include the implementation of a Variable-air-Volume (VAV) ventilation system with CO_2 monitoring control that will activate the HVAC equipment on demand, further improving the energy performance of the system.

Implementation of this project will result in about $4,300 annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 5.4 cars off the road every year.

	EXISTING	PROPOSED
Refrigeration capacity	Three (3) 20-ton units	Two (2) 30-ton units
EER (Btu/W-hr)	8.5	10.3
Hours at peak load	1548	1548
Electricity used (kWh)	147,515 kWh	108,210 kWh
GHG emissions (Mt CO_2e)	106	77.7

1b SPLIT SYSTEM AIR CONDITIONING UNITS

While the Julian Smith Casino was constructed in 1939, numerous modifications have been made to the air conditioning system over the years. This includes the addition of a 7.5 Ton split air conditioning system to service the kitchen preparation area. The added split air conditioning system was installed in the late 1990's and includes a standard efficiency rating of 9.3 SEER. While the unit is still in good condition, replacement could be justified over the next few years as the equipment approaches its expected 15 year median life. Currently, counterpart systems are available with an efficiency rating of 21 SEER.

Augusta plans on replacing the existing unit with a high efficiency counterpart as it approaches its median life expectancy. The selected replacement unit should be specified to include automated economizer control to take advantage of free cooling during milder temperatures. A programmable thermostat should also be installed to control this system providing the ability to perform night temperature setback when the building is unoccupied.

Implementation of the high efficiency air conditioning unit will result in about $920 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 1.1 cars off the road every year.

	EXISTING	PROPOSED
Refrigeration capacity	One 7.5-ton unit	One 7.5-ton unit
A/C efficiency	9.7 SEER	18 – 21 SEER
Electricity used (kWh)	14,981 kWh	6,634 kWh
GHG emissions (Mt CO_2e)	10.8	4.8

2 REPLACE AIR CONDITIONING UNITS AT THE AQUATIC CENTER

BUDGET: **$59,400**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **46,372 kWh**

ANNUAL ENERGY COST SAVINGS: **$5,100/YEAR**

CARS OFF THE ROAD:

The Augusta Aquatic Center is the premier aquatic facility in the CSRA. The Center offers a venue for both family-oriented and competitive level activities providing a wide range of aquatics programs. The 40,000 square feet Aquatic Center, opened in 1999, includes an Olympic size competition pool and an instructional pool, food court and a conference room.

An energy audit conducted in November 2009 revealed that due to proper preventative maintenance the Aquatic Center has seen minimal equipment replacements. The Aquatic Center is served by 9 low efficiency air conditioning units installed in 1999. While these units are in good condition, replacement with higher efficiency systems could be justified over the next few years as the equipment approaches its expected 15 year median life. When constructed, the efficiency of air conditioning units was high for that time. However, the industry today offers more efficient systems. The existing air conditioning units have an efficiency rating of 9.7 SEER. Counterpart systems are available with an efficiency rating of 21 SEER.

Augusta intends to replace the units with high efficiency counterparts as they approach their median life expectancy. The selected replacement units should be specified to include automated economizer control to take advantage of free cooling during milder temperatures.

Replacement of nine air conditioning units will result in about $5,100 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 6.4 cars off the road every year.

	EXISTING	PROPOSED
Refrigeration capacity	Nine (9) 5-ton units	Nine (9) 5-ton units
A/C efficiency	9.7 SEER	1548
Electricity used (kWh)	86,117 kWh	38,809 kWh
GHG emissions (Mt CO_2e)	61.8	27.9

3 UPGRADE MECHANICAL SYSTEMS AT THE MUNICIPAL BUILDING

BUDGET: **$4,800**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **21,878 kWh**

NATURAL GAS SAVINGS: **920 THERMS**

ANNUAL ENERGY COST SAVINGS: **$3,327/YEAR**

CARS OFF THE ROAD:

(Does not include 3b)

3a AIR HANDLING UNIT MOTORS

The Municipal Building uses a large number of Air Handling Units (AHUs) to serve the offices and court room areas. There is typically one air handler per floor with a total of 9 floors. The AHUs operate only during occupied hours controlled by the central building automation system. Seven motors should be replaced with high efficiency counterparts. These motors serve the return fan of the AHU. The existing motors are 77 percent efficient while new 87.6 percent NEMA premium efficiency motors are available. Augusta plans to replace these motors to reduce energy consumption and energy cost.

Implementation of this project will result in about $504 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 0.6 cars off the road every year.

	EXISTING	PROPOSED
Motor type	1.5 HP	1.5 HP
Motor efficiency	77%	87.6%
Operating hours	6576	6576
Electricity used (kWh)	37,772 kWh	33,194 kWh
GHG emissions (Mt CO_2e)	27.1	23.8

3b CONTROL STRATEGY FOR AIR HANDLING UNIT VFDS

The fan speed of the Air Handling Units (AHUs) is controlled by Variable Frequency Drives (VFDs) serving the majority of supply and return fan motors. Currently these fans are operated at 100 percent fan speed and do not modulate down to lower speeds as they are designed to do using the VFD control. All 17 fan motors that utilize VFDs operate at 100 percent speed even during low occupancy and temperature load periods.

To reduce energy usage, the control strategy for the AHU fan motor operation should be adjusted to allow the fan motors to modulate down to lower speeds when full load heating or cooling is not required. Significant energy savings from both reduced fan motor operation and reduced heating and cooling loads could be realized. Assuming that fan speed can be modulated down to 75 percent of full load a quarter of the day this project will result in about $5,506 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 7 cars off the road every year.

	EXISTING	PROPOSED
Number of motors	17	17
Total horse power	32HP	32HP
Primary VFD speed	100%	75%
Electricity used (kWh)	114,700 kWh	64,649 kWh
GHG emissions (Mt CO_2e)	82.4	46.4

3c HOT WATER HEATER RECIRCULATION PUMP CONTROL

The Municipal Building uses one central 116 gallon hot water heater for potable drinking water. The hot water system circulates water throughout the building using a 1/12 Horse Power motor that operates continuously.

Most commercial buildings utilize a domestic hot water recirculating system to ensure that hot water is immediately available at any point in the building. A hot water recirculating system typically consists of a small fractional horsepower pump and a return piping system. Hot water is continuously pumped through the supply piping system. If water is not being used, it is recirculated back to the storage tank through a return piping system. The recirculating pump system increases energy consumption because of the additional pumping energy requirements and piping heat loss. Heat losses result because the distribution piping is always warm. In air-conditioned spaces, this heat loss may add to the air-conditioning load.

To reduce motor energy consumption and, more importantly, piping heat loss, a timer should be installed on the hot water recirculation pump to shut off the system at night when the building is unoccupied. The timer should be programmed to turn off the pump 30 minutes after occupants leave and 30 minutes prior to the opening of the building.

Implementation of this project will result in about $980 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 1 car off the road every year.

	EXISTING	PROPOSED
Pump operating hours	8,760	4,368
Electricity used (kWh)	1,089 kWh	543 kWh
Natural gas used	1,975	1,055
GHG Emissions (Mt CO_2e)	10.7	5.7

3d TOILET EXHAUST FANS NIGHT SHUT-OFF

Currently, toilet exhaust fans at the Municipal Building run continuously, during both occupied and unoccupied hours. Energy savings can be achieved by cycling the exhaust fans off during unoccupied hours. These savings include energy required to operate the fan and energy used to heat and cool the air that is exhausted.

We recommend that programmable timers be installed on the toilet exhaust fans so that they only run during occupied hours. Also, staff may choose to integrate the control of these exhaust fans into the existing building automation systems. Based on the current occupancy schedule, it is recommended that the exhaust fan for the restrooms be cycled off at 9:00 pm and cycled back on at 6:00 am.

Implementation of this project will result in about $1,800 in annual energy cost savings. This does not include the savings that would be realized from heating and cooling due to the AHU being shutdown at night. The greenhouse gas emissions offset will be equivalent to taking 2.3 cars off the road every year.

	EXISTING	PROPOSED
Fan operating hours	8,760	4,368
Electricity used (kWh)	33,417 kWh	16,663 kWh
GHG Emissions (Mt CO_2e)	23.9	11.9

4 TIE HVAC SYSTEMS INTO THE MUNICIPAL BUILDING CENTRAL PLANT

BUDGET: **$265,065.50**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **29,006 kWh**

ANNUAL ENERGY COST SAVINGS: **$3,191/YEAR**

CARS OFF THE ROAD:

This project consists of replacing 8 packaged and split system HVAC units in the Municipal Building Complex. The intent is to tie the new units into the existing central plant. To achieve this task the compressor sections and air handlers are to be replaced and new VAV units or another type of terminal units need to be installed.

The existing units are of varying size ranging from 3 to 7.5 tons each with a weighted average efficiency of 8.6 SEER. The existing Municipal Building has two chillers, boilers and a two pipe distribution system. By tying the units to the Municipal Building Complex central plant, annual energy savings are estimated at 29,006 kWh from more energy efficient (12 EER) central system.

5 UPGRADE HVAC UNITS THROUGHOUT COUNTY BUILDINGS

BUDGET: **$226,742**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **266,823 kWh**

ANNUAL ENERGY COST SAVINGS: **$29,351/YEAR**

CARS OFF THE ROAD: **X 36.5**

This project consists of replacing 20 packaged and split system HVAC units on several municipal buildings throughout the city-county. The existing units are of varying size with an average of 5 tons. The units are outdated beyond their economic life time. The efficiency of the existing units is 5 SEER. The project is to replace these units with energy efficient counterparts of 18 SEER for units under 5 tons, and 12 EER for units above 5 tons.

Annual estimated energy savings from more energy efficient systems are 266,823 kWh.

At right is the list of units that will be replaced and estimated savings.

LOCATION	SIZE (tons)	SAVINGS (kWh)
Pendleton King Park	4	10,733 kWh
PKP Caretakers Cottage	2.5	6,708 kWh
Traffic Engineering on Riverfront	3.5	9,391 kWh
Admin on Telfair	5	13,416 kWh
Call Center	10	21,672 kWh
	15	32,508 kWh
	10	21,672 kWh
	5	13,416 kWh
Maintenance Tobacco Road	2	5,366 kWh
	2.5	6,708 kWh
Roads and Bridges - Broad Street	7.5	16,254 kWh
	2.5	6,708 kWh
Shop I	4	10,733 kWh
Laundry	5	13,416 kWh
Transfer Station	7.5	16,254 kWh
	7.5	16,254 kWh
Offices	2	5,366 kWh
	5	13,416 kWh
	5	13,416 kWh
	5	13,416 kWh

6 IMPLEMENT LIGHTING RETROFIT PROJECTS

BUDGET: **$62,140**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS: **244,397 kWh**

ANNUAL ENERGY COST SAVINGS: **$26,884/YEAR**

CARS OFF THE ROAD:

X 33.5

(Does not include 6a)

Augusta intends to conduct energy audits at all major recreation centers and facilities and other city facilities, to identify energy reduction opportunities and related economic benefits. Energy audits were performed in November 2009 at selected facilities, including the Julian Smith Casino, the Aquatic Center, and the Municipal Building. Upon the energy audits, it was determined that major improvements can be realized by upgrading HVAC equipment, lighting fixtures and controls. Among the potential improvements, lighting retrofits typically have the most attractive payback time of a few months up to 2 to 3 years.

6a OUTDOOR RECREATION FACILITIES

Augusta's Recreation & Parks Department operates and maintains over 67 parks and community centers, including playgrounds, aquatics, golf courses, and other indoor and outdoor athletic facilities. Operating costs of these facilities have become a major burden for the Department. For this reason, the Recreation & Parks Department has taken some steps to cut operating costs, and has set short-term goals to conserve energy and reduce related costs.

Augusta strives to provide high safety levels while limiting light pollution, and reducing energy consumption and related operating costs. Upgrading indoor and outdoor lighting fixtures and controls at the outdoor athletic fields, walking tracks, community centers, and other rental facilities can result in significant energy and cost savings.

There are approximately 750 lighting fixtures at outdoor ball fields and tennis courts. All fixtures include conventional metal halide lamps, of varying wattage, remotely controlled by on-site staff. They are usually spot-replaced as needed. Additional lighting fixtures are installed along 13 walking tracks. The City intends to evaluate the opportunity of replacing selected fixtures with Light Emitting Diode (LED) technology, and replicate the project if it meets cost and energy efficiency expectations. LEDs could reduce operating costs and extend the lifespan – by as much as five times – of outdoor lighting.

Additionally, the City plans to upgrade the existing lighting fixtures at its Community Centers and rental facilities, and install controls such as timers, occupancy or daylight sensors where feasible, to reduce energy usage according to the actual demand. Cost savings resulting from the upgrades will be used to fund other lighting improvements.

To the extent possible, the City plans to employ lighting fixtures approved by the International Dark-Sky Association (IDA) for outdoor fixtures. The IDA certifies dark sky friendly fixtures that reduce the amount of light aimed into the night sky, and provides a directory of IDA-Approved™ fixtures and manufacturers.

6b AQUATIC CENTER

The Aquatic Center is a fairly new building with operating hours Monday through Friday from 6am to 8pm, and Saturday 9am to 3pm. During these times the center is active with employees and guests. The building includes locker rooms, fitness center, swimming pool, mechanical pumping room, public halls/meeting areas, and employee-only office spaces. While the Aquatic Center is a relatively new facility, there are several opportunities, such as lighting upgrades, to increase the energy performance of the facility.

Augusta plans to retrofit the existing T-12 linear fluorescent fixtures in the public spaces and employee offices with more efficient T-8 linear fluorescent fixtures, which will provide equal lighting capabilities and significantly less energy usage. The existing fixtures are in good condition, therefore retrofitting only the lamps and ballasts will provide the most cost-effective replacement solution.

Overall about 80 percent of the building lighting needs retrofit to T8 technology not including the Pool area high bay fixtures. Lighting retrofit in the public spaces and employee offices will result in about $5,100 in annual energy cost savings. The greenhouse gas emissions offset will be the equivalent to taking 6.3 cars off the road every year.

	EXISTING	PROPOSED
Lighting type	10 – 2'x4' (3-lamp) F40T12 fixtures	110 – 2'x4' (3-lamp) F32T8 fixtures
	9 – 2'x4' (2-lamp) F40T12 fixtures	9 – 2'x4' (2-lamp) F17T8 fixtures
Hours at peak load	36.85	28.4
Electricity used (kWh)	201,201 kWh	155,048 kWh
GHG Emissions (Mt CO_2e)	143.75	110.8

Richmond County Court House, 1905
© Library of Congress, Detroit Publishing Company, 1880-1920

6c MUNICIPAL BUILDING

The Municipal Building operates mostly six days a week on a 24-hour schedule. Maintenance staff has slowly been replacing T12 light fixtures with more efficient T8 lamps in both 8 feet and 4 feet lengths over the past few years. The retrofit consisted of fabrication by the staff on a one-by-one basis whenever ballasts or fixtures burned out. Though this retrofit has not yielded the highest quality of light fixture in terms of optical efficiency, it has allowed building to slowly yield savings. About 60 percent of the T12 fixtures in the office and public spaces have already been converted to the fabricated fixtures. Augusta should replace fixtures in priority areas with completely new fixtures with better reflectors and use the fabricated fixtures in less occupied spaces, but to retrofit the reflectors to a highly efficient specular reflector.

For areas with non-dimming incandescent fixtures, such as mechanical rooms, electrical rooms, storage, and judicial courts, a conversion to compact fluorescent lamps (CFLs) would yield a fast return on investment. The Judicial Courts room uses large chandeliers with more than 40 15-watt incandescent decorative lights. These can be replaced with LED bulbs of similar "warm white" color, and yield significant savings in yearly bulb maintenance and energy use. Additionally, many ceiling flood lights could be modified to use compact fluorescent floods.

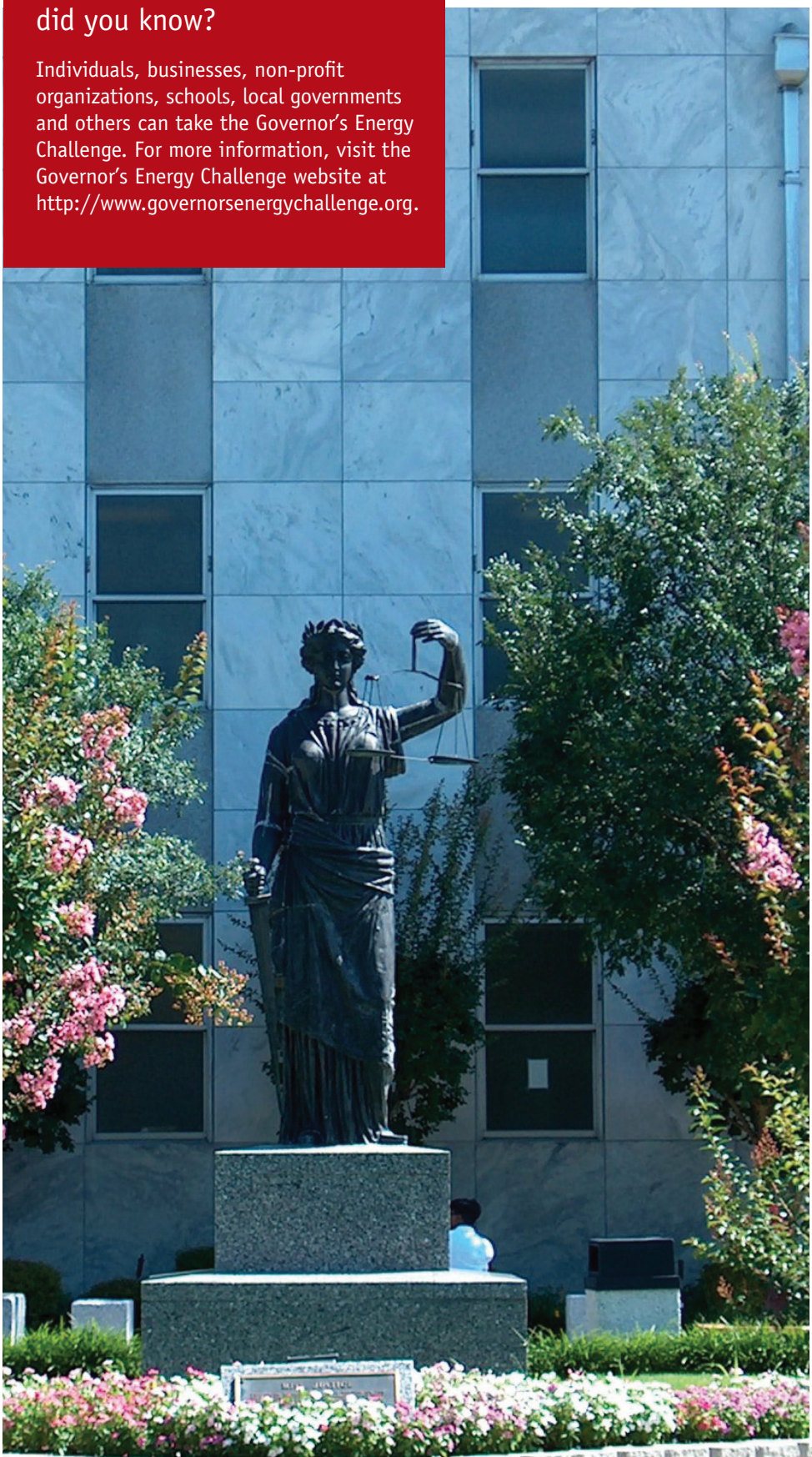
Overall about 40 percent of the building lighting needs retrofit to T8 technology, and many of the employee-fabricated retrofits could benefit from adding highly specular reflectors. Also, all remaining incandescent lamps should be replaced with CFL or LED counterparts.

Implementation of this project will result in about $21,800 annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 27.2 cars off the road every year.

	EXISTING	PROPOSED
Lighting type	24 – 2'x4' (1-lamp) F40T12 fixtures	24 – 2'x4' (1-lamp) F32T8 fixture
	215 – 2'x4' (2-lamp) F40T12 fixtures	215 – 2'x4' (2-lamp) F32T8 fixture
	3 – 2'x4' (3-lamp) F40T12 fixtures	3 – 2'x4' (3-lamp) F32T8 fixture
	148 – 2'x8' (1-lamp) F96T12 fixtures	296 – 2'x4' (1-lamp) F32T8 fixture
	435 – 2'x8' (2-lamp) F96T12 fixtures	870 – 2'x4' (2-lamp) F32T8 fixture
	80 – 2'x8' (3-lamp) F96T12 fixtures	160 – 2'x4' (3-lamp) F32T8 fixture
	18 – 2'x8' (4-lamp) F96T12 fixtures	36 – 2'x4' (4-lamp) F32T8 fixture
	72 - 15 Watt incandescent screw	72 – 4 Watt LED candelabra
	36 - 100 Watt incandescent screw	36 - 28 Watt LED
	1 - 200 Watt incandescent screw	1 - 51 Watt LED
Hours at peak load	145	93.5
Electricity used (kWh)	558,200 kWh	359,956 kWh
GHG emissions (Mt CO_2e)	399	257

did you know?

Individuals, businesses, non-profit organizations, schools, local governments and others can take the Governor's Energy Challenge. For more information, visit the Governor's Energy Challenge website at http://www.governorsenergychallenge.org.



7 INSTALL OCCUPANCY SENSORS ON VENDING MACHINES

BUDGET: **$1,350.00**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS:
5,992 kWh

ANNUAL ENERGY COST SAVINGS:
$659/YEAR

CARS OFF THE ROAD:

The Municipal Building and the Aquatics Center have a number of soda and snack machines within the facilities. These vending machines operate continuously, even when the buildings are unoccupied. Vending machines occupancy control devices are available that can cycle the display lights and refrigeration compressor depending on occupancy, room temperature and an interval time. The control devices are programmed to maintain optimal temperature for the product to ensure no loss in product taste or overall sales occur. These control devices will reduce the run time of the vending machines reducing energy usage and operating costs.

Often vending machine leasing companies will install an occupancy control device at no cost to the customer or replace the vending machine with a new unit that has occupancy control built in. Vending machine occupancy sensors could be installed on all vending machines located within Augusta municipal buildings. Installing vending machine sensors at the Municipal Building and the Aquatic Center will result in about $660 in annual energy cost savings. The greenhouse gas emissions offset will be equivalent to taking 0.8 cars off the road every year.

8 TAKE THE GOVERNOR'S ENERGY CHALLENGE

A key driver in developing Augusta's Strategy was to meet or exceed the Governor's Energy Challenge. Augusta plans to officially embrace the Energy Challenge and sign the pledge to meet the Energy Challenge by reducing energy use at City's buildings and facilities by at least 15 percent by 2020 from the 2007 baseline. The Georgia Environmental Facilities Authority (GEFA) provides information on the necessary steps to take the Energy Challenge.

9 MANAGE ENERGY AND WATER USE WITH PORTFOLIO MANAGER

Augusta should establish an Energy Management System across the municipal buildings and facilities by using the online energy management tool Portfolio Manager to track energy usage, water consumption and utility costs of its buildings and facilities, including water and wastewater treatment plants, recreation facilities, administrative buildings, and police and fire stations. Portfolio Manager will serve to establish energy saving priorities and to assess and track energy performance and improvements over time, including monitoring progress towards achievement of its Energy Challenge goal. Portfolio Manager can also be used to track greenhouse gas emissions.

City staff will update the energy data monthly according to the billing cycles, and will periodically review reports to evaluate energy improvements, identify underperforming buildings, and prioritize energy saving opportunities.

10 PREPARE A CITY-WIDE GREENHOUSE GAS INVENTORY

A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specific period of time. A greenhouse gas inventory can help organizations set greenhouse gas emission reduction target goals over time. Augusta does not have a greenhouse gas emission inventory, so a specific greenhouse gas emission reduction goal has not been set yet.

Augusta plans to prepare and use a greenhouse gas emission inventory to set target greenhouse gas emission reduction goals to integrate with the energy reduction goal embraced with accepting the Governor's Energy Challenge. The greenhouse gas emission reduction goals will reflect greenhouse gas reductions achieved from implementation of the City's plan to reduce total energy consumption by 15 percent from 2007 levels and other factors. Consequently, Augusta will use calendar year 2007 for its greenhouse gas inventory baseline, and will set a reduction target goal for the year 2020.

An Inventory Management Plan (IMP) will be developed as part of the greenhouse gas emission inventory to produce comparable inventory data from year to year and to ensure that the greenhouse gas emission inventory is maintained in a consistent manner. The IMP serves to identify inventory boundaries, document calculation methodologies and is necessary to produce comparable inventory data over time. The IMP provides a reproducible and transparent inventory and describes how to update the inventory as new calculation methodologies become available or as changes are made to City operations.

Table 1 shows energy usage and corresponding greenhouse gas emissions by type for selected City operations, excluding the school system.

ENERGY SOURCE	ENERGY DATA	GHG EMISSIONS (Mt CO_2e)[2]
Natural gas	5,756,200 cf [1]	288
Electricity	65,649,887 kWh[1]	47,147
Gasoline	899,227 gal	7,994
Diesel Fuel	542,914 gal	5,728
Biogas to Flares (landfill)	87.3 MMcf	2,038
Biogas to Flares (water control)	51.1 MMcf	1,680
Renewable Energy (Biogas sent offsite)	239.6 MMcf	N/A
Total Energy	**863,151 MMBtu**	**64,875**

Table 1. CY 2007 Energy and Greenhouse Gas Emissions Data for Selected City Operations

(1) Incomplete account (2) Based on the EPA Greenhouse Gas Equivalency Calculator
(3) Cf =cubic feet, kWh=kilowatt-hour, gal=gallons, MMcf=million cubic feet, MMBtu=Million BTU

did you know?

City operations generate an amount of greenhouse gas emissions equivalent to the emissions generated by 5,787 average homes every year. To offset this amount, approximately 12,400 cars should be taken off the road every year.

strategy two

IMPROVED TRANSPORTATION

Strategy Two is focused on reducing fuel consumption and relative greenhouse gas emissions in the transportation sector, with actions that directly involve public and private entities. By reducing traffic congestion with the right infrastructure, and by decreasing operating costs related to the transportation sector, Augusta has the opportunity to offer its residents a more affordable place to live at higher standards.

goals

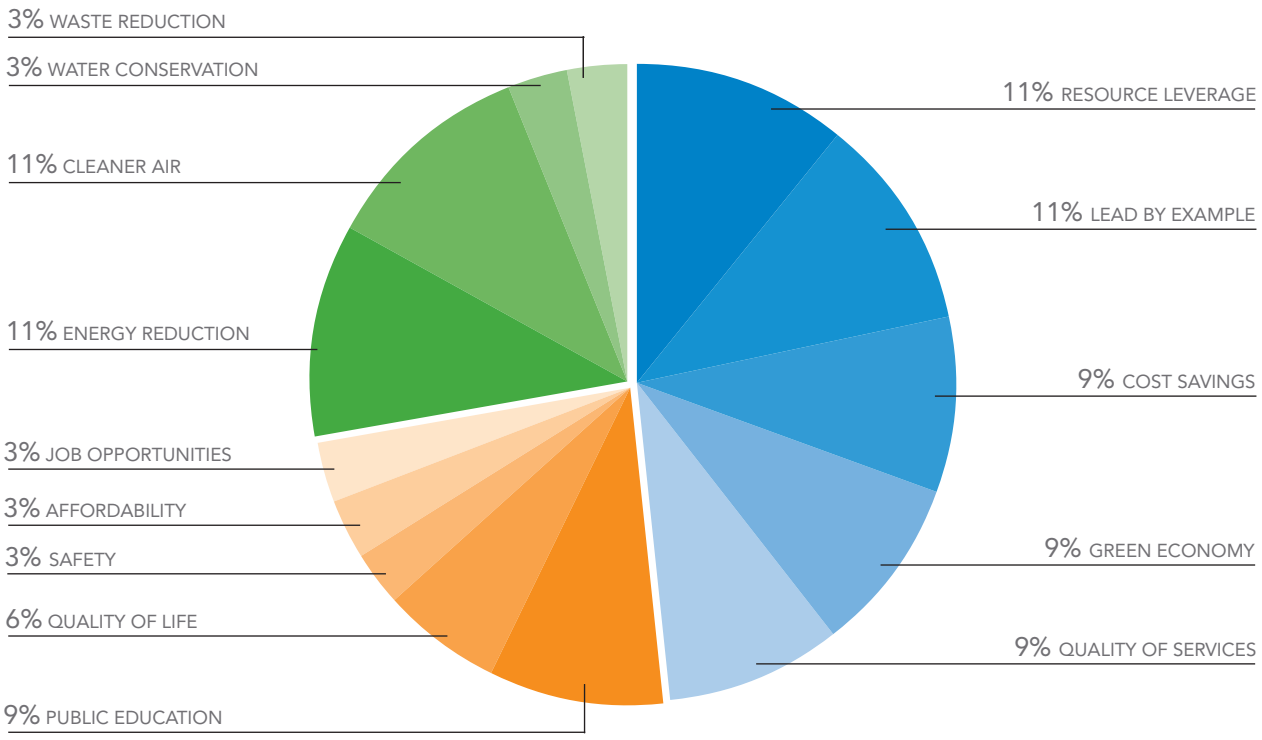
- Reduce fossil fuel consumption
- Reduce electrical energy usage
- Reduce overall operating costs
- Create new jobs

actions

11. Install LED Traffic Signals (*)
12. Install Adaptive Traffic Signal Systems (*)
13. Upgrade Municipal Fleet
14. Promote Alternative Transportation

(*) partially funded by the EECBG Program

benefits: environment / economy / society




DONT
WALK
10 TH ST
SunTrust


Clean Air Hybrid Bus
SERVICE

11 INSTALL LED TRAFFIC SIGNALS

BUDGET: **$193,927**

JOB CREATION/RETENTION:

ELECTRICITY SAVINGS:
668,338 kWh

ANNUAL ENERGY COST SAVINGS:
$73,517/YEAR

CARS OFF THE ROAD:
X 92

Traffic signals and streetlights are significant consumers of electricity. Upgrading to more efficient LED lighting technology can reduce electrical energy consumption by up to 80 percent from incandescent lights. Augusta has set a goal of installing LED lights in all county traffic signals. To date, the City has installed LED traffic lights at 113 intersections.

Augusta plans to convert traffic lights at 71 intersections in Augusta-Richmond County from incandescent bulbs to LED technology. Implementation of this project will complete the countywide conversion of traffic signal lighting to LED lighting. In all, replacing 1,846 bulbs will save 668,338 kWh every year.

Implementation of this project will result in about $73,500 annual energy cost savings. Augusta plans to use the operational cost savings from this project to fund other energy improvements. The greenhouse gas emissions offset will be equivalent to taking 92 cars off the road every year.

12 INSTALL ADAPTIVE TRAFFIC SIGNAL SYSTEM

BUDGET: **$766,506**

JOB CREATION/RETENTION:

FUEL SAVINGS: **283,166 GALLONS GASOLINE**

ANNUAL FUEL COST SAVINGS:
$737,533/YEAR

CARS OFF THE ROAD:
X 481

The Augusta Regional Transportation Study (ARTS) monitors roadways for Level-of-Service (LOS), a measure of how congested a roadway is. The transportation LOS system uses the letters A through F to identify the level of congestion, with A meaning no congestion. A congested roadway is one with a classification of C or less.

Augusta has indicated minimum LOS designation acceptable to maintain the quality of life for its residents. Once a roadway receives a C classification, the ARTS group will advise what actions are needed to improve the roadway level of service. These actions become part of the Traffic Improvement Program (TIP) for the ARTS Area, which is annually updated. Projects listed in the TIP are typically funded 80 percent with federal funds and the remaining 20 percent with state and local funds.

The most recent TIP (FY 2010-13) includes road widening projects, as

did you know?

Augusta participate in the ARTS program, a planning program addressing transportation issues at a large regional scale, including urbanized portions of Aiken County in South Carolina, and Columbia and Richmond Counties in Georgia.

well as a street light and traffic signal upgrade project on Broad Street between 5th Street and 13th Street in downtown Augusta, funded in most part by the American Recovery and Reinvestment Act of 2009 (ARRA).

Augusta's goal is to improve the quality of life by reducing traffic congestion with improved road infrastructure. Less traffic means less congestion, more efficient transportation, reduced fossil fuel consumption, and better air quality and overall better quality of life for the commuters. One method to reduce the impact of the number of vehicles on roadways is to ensure that traffic flows smoothly.

One of the City's objectives is to upgrade the existing road network with a regional Intelligent Transportation System, used to improve safety, transportation efficiency, and performance of streets and highways. The City plans to install adaptive traffic signals at 25 intersections across the City to reduce traffic congestion and delay and subsequent air pollution by adapting signals timing to traffic conditions. The installation of adaptive traffic signals at the Fort Gordon gates, along Wrightsboro Road and Washington Road will reduce congestion along these heavily traveled routes and reduce the number of corridors that have a LOS ranking of C or less.

"InSYNC" is a proprietary technology that continuously updates the signals timing plans along a corridor based on the traffic volume demand. The InSYNC adaptive traffic system reduces stops by up to 90%, fuel consumption by 20%, and vehicle emissions by 30%. Actual data from independent verification studies showed fuel savings of 11,500 gallons per intersection for an average daily traffic of 30,000 vehicles.[3]

2a. Fort Gordon Gates
Augusta plans to install adaptive traffic systems at Gates 1 and 2 of Fort Gordon. Gates 1 and 2 are located approximately seven miles apart on Fort Gordon highway. With an average daily vehicle count of 25,000 vehicles per day on the stretch of Gordon Highway between Gates 1 and 2, the projected annual fuel savings are 19,167 gallons of gasoline per year, which is equivalent to taking 33 cars off the road every year.

Fort Gordon is the largest single employer in Richmond County, employing almost a quarter of the City workforce. Public transit currently does not serve Fort Gordon or the immediate area. Consequently, installation of adaptive traffic signals will benefit the community as a whole by reducing traffic congestion, and reducing related greenhouse gas emissions.

2b. Wrightsboro Road
The City plans to install adaptive traffic systems at 8 intersections along a six-mile span of Wrightsboro Road. The intersections are located between Jackson Road and Barton Chapel Road. With an average daily vehicle count of 30,000 vehicles per day on this stretch of Wrightsboro Road, the projected total annual fuel savings is 92,000 gallons of gasoline per year, which is equivalent to taking 156 cars off the road every year.

This stretch of Wrightsboro Road contains five major shopping centers, and serves to connect to I-520, the Bobby Jones expressway.

2c. Washington Road
The City plans to install adaptive traffic systems at 15 intersections along a fourteen-mile span of Washington Road. The intersections are located between Pleasant Home Road and Woodbine Road. This stretch of Washington Road contains 8 major shopping centers, borders the Master's Golf Course and serves as a major connection to I-20.

The average daily vehicle count on this stretch of Washington Road is 40,000 vehicles per day, which is higher than the traffic count observed in the fuel verification study. Because the relationship between fuel savings and increased vehicle count cannot be inferred a priori, we assume that there is no change in fuel savings with the higher vehicle count. As a result, the annual fuel savings in Washington Road is projected at 172,500 gallons per year, which is equivalent to taking 293 cars off the road every year.

[3]http://www.rhythmtraffic.com/Doc/InSync.pdf

Cadet Battalion, Academy of Richmond County, 1918
© Library of Congress, Miller Studio, 1918

did you know?

The City of Augusta has been a leader in adapting technologies that reduce fossil fuel usage and reduce greenhouse gas emissions. In 1997, the Augusta-Richmond County Public Transit was the first public transit group to operate a hydrogen-fueled bus. The bus operated in the actual transit fleet for one year to acquire data needed for the commercialization of hydrogen vehicles. The hydrogen bus had negligible greenhouse gas emissions and operated successfully. After one year of operation in Augusta, the bus was transferred to Las Vegas, Nevada as part of the DOE hydrogen demonstration project.[4]

13 UPGRADE MUNICIPAL FLEET

Augusta's Fleet Management Department manages the municipal fleet for all City departments. Fleet Management is responsible for the administration of all services related to preventive maintenance, repairs, fueling, record retention, and recapitalization of the City's fleet of vehicles, equipment, and machinery. Fleet Management tracks fuel consumption patterns and annually reviews the operational condition of each department's fleet, identifying those assets that meet the replacement criteria, and estimating replacement cost. The criteria used to establish replacement schedules are maintenance cost, mileage, hours of operation, age of vehicle or equipment, and availability of funds.

Currently, several vehicles and equipment are past due for replacement, including equipment for the Public Service Department and vehicles for Law Enforcement, which account for over half of the annual fuel consumption. Fleet Management has not acquired any alternative fuel vehicles, except an electric pickup truck for the Recreation & Parks Department. Overall, the municipal fleet consumes about 900,000 gallons of gasoline and about 400,000 gallons of diesel per year since 2001. However, the cost of gasoline and diesel have almost quadrupled since then, making the operating cost of the fleet an increasing burden for the City.

To address this issue, Augusta plans to develop a sustainable vehicle plan to replace vehicles on a rolling basis with fuel-efficient vehicles, and reduce its fleet where possible, to minimize its environmental footprint and its maintenance and operating costs. Through diversification of fuels for City vehicles and equipment, Augusta will reduce its dependence on high emission fuels. Fossil fuel usage from City vehicles will be tracked using existing methods. Greenhouse gas emissions from City vehicles will be estimated following U.S. EPA guidance.

[4]The hydrogen-fueled bus was the product of a research coalition comprised of the Department of Energy (DOE), Westinghouse Electric Corporation, Blue Bird Body Company, and Hydrogen Components, Inc. The bus had a hybrid-powered system consisting of a hydrogen-fueled internal combustion engine in series with electric batteries and an electric motor. The engine operated on low-pressure hydrogen that was stored on metal hydride beds.

14 PROMOTE ALTERNATIVE TRANSPORTATION

The Augusta-Richmond County Public Transit (APT) system serves the City of Augusta-Richmond County and a selected portion of Columbia County. The fleet consists of 33 conventional diesel-fueled buses of varying size running approximately 600,000 miles a year. Currently, only 13 buses and 7 paratransit buses are in service daily. The APT has applied for a Section 5307 grant from the Federal Highway Administration (FHA), funded by the ARRA, to purchase 3 new buses to replace the out-of service vehicles.

APT plans also to purchase hybrid buses for its fleet. Field-testing results of diesel hybrid-electric buses have shown a minimum of 10 percent increase in fuel economy compared to conventional diesel buses, and significant decrease in air pollutants – 50 percent less particulate matter (PM) emissions and 36 percent lower oxides of nitrogen (NOx) emissions.[5]

Data from the 2000 Census shows that only one percent of the work force in Augusta uses public transportation to get to their place of employment. By far, the preferred method of transportation by City residents is the use of private vehicles, preferred by more than 74 percent of the residents. One of the reasons behind this trend is that almost a quarter of the City's workforce is employed at Fort Gordon, which is not currently served by the APT system. The 2008 Augusta-Richmond County Comprehensive Plan identified this issue, along with potential solutions to reduce the number of single-occupant vehicles on roadways, and to provide more transportation choices to the community.

In an effort to reduce the overall mileage of the public transit fleet, the APT has located a centralized transit hub near downtown Augusta. Most of the public transit routes travel through the downtown area. Augusta plans to conduct surveys periodically to identify ways to increase public transportation participation rate and reduce dependency on the automobile, and will engage in a sustainable transportation campaign to encourage its residents in using alternative modes of transportation, including the use of bicycle, public transportation, carpooling, and car-sharing programs. To encourage its residents in using alternative means of transportation, the City is also planning to provide the necessary infrastructure for bicycles, including bike trails and bike racks at major public amenities.

[5]Field testing results from NREL/DOE "NYCT Diesel Hybrid-Electric Transit Buses" available at http://www.nrel.gov/vehiclesandfuels/fleettest/pdfs/nyct_final_results.pdf

Broad Street, 1903
© Library of Congress, Detroit Publishing Company, 1880-1920

strategy three

RENEWABLE ENERGY

Strategy Three focuses on encouraging and implementing renewable energy projects within the City that will result in offsetting energy demand and in reusing energy that would otherwise go to waste. It is an opportunity for Augusta to lead by example and to offer new job opportunities to its residents and businesses.

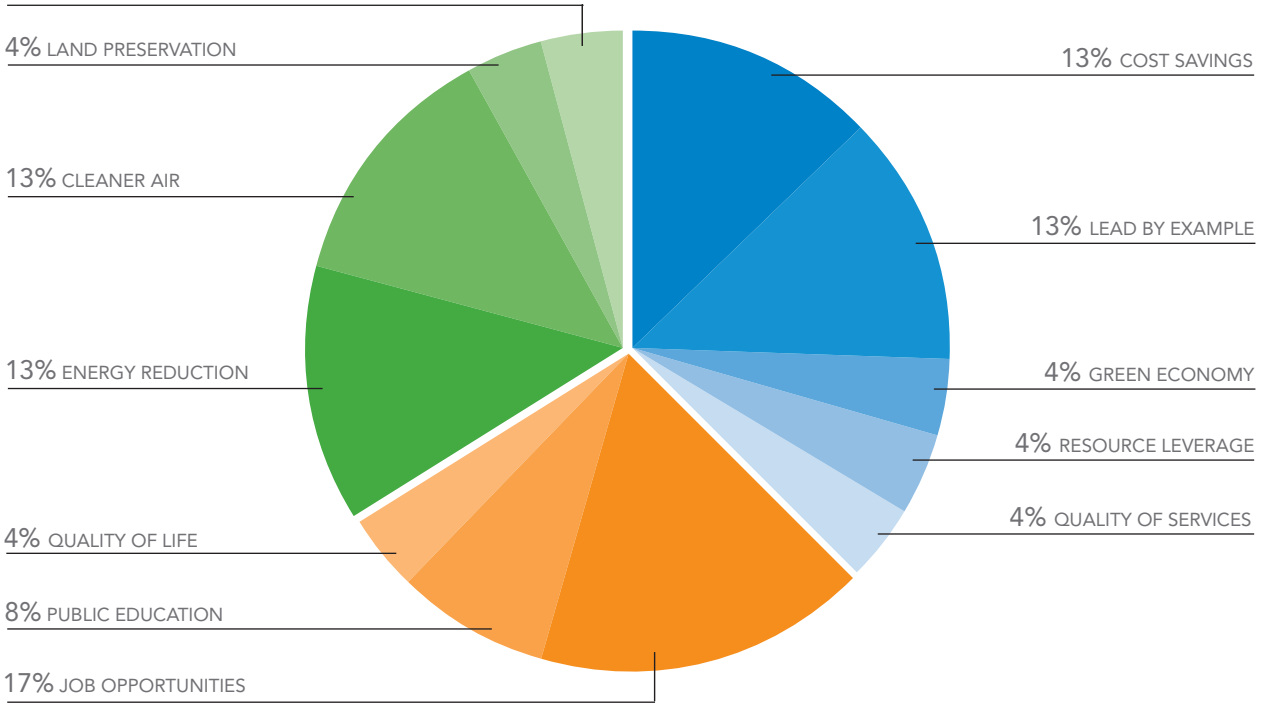
goals

- Evaluate renewable energy projects
- Reduce overall operating costs
- Create new jobs
- Lead by Example

actions

15. Implement Gas Recovery Project at the Messerly Water Pollution Control Plant
16. Implement Gas Recovery Project at Landfill
17. Install a Solar Cap on Landfill
18. Design a Reclaimed Water Infrastructure

benefits: environment / economy / society



15 IMPLEMENT GAS RECOVERY PROJECT AT THE MESSERLY WATER POLLUTION CONTROL PLANT

To reduce the total energy consumed by plant operations, a portion of the methane gas produced at the Messerly Water Pollution Control Plant is recovered and reused as a fuel for process heating. Methane gas is always produced as a byproduct of the digestion process. The production of methane gas is a function of the amount of water treated, volatile solids content of the water and other factors. On average, the digestion process will produce a gas with an energy content of 2,015 therms per day, equivalent to the energy used to heat about 1,286 households every year.

Since 2009 a fraction of the methane gas produced from the digestion process is captured and serves as the fuel source for the digestion process heaters, keeping the process at the optimum temperature of 95°F. Recovering methane gas for the heaters, instead of using natural gas from the pipeline, results in greenhouse gas reduction of 710 Mt CO_2 eq per year, which is equivalent to taking 136 cars off the road every year.

As expected, fuel usage peaks in the wintertime when the outside temperatures are cooler. Based on historical operating data, the minimum daily energy requirement for the digestion process heaters is 355 therms per day. The excess methane gas (approximately 1,660 therms per day) is combusted in a flare. This practice reduces the greenhouse gas emissions of the methane gas.

Augusta evaluated alternative uses for the methane gas, including production of electrical energy or pipeline gas in 2003. At that time, these options were determined not economically feasible. Augusta plans to update the study to reflect current economic conditions as well as the use of funding that may be available from the public and private sector. Several industrial facilities are located near the wastewater treatment plant and could serve as potential electric or gas customers, should economics become favorable in the future.

At the water pollution control plant, wastewater is reclaimed using a process that produces biosolids. The anaerobic digestion of biosolids at the plant produces methane. For safety reasons, methane gas produced in the digestion treatment process is captured and destroyed. The current practice (prior to calendar year 2009) was to combust the methane in a flare, because this reduces greenhouse gas emissions.

In 2010, a new biological treatment process started up at the Messerly Water Pollution Control plant. The new biological process is more efficient – it requires less oxygen for biological degradation. The biological treatment of wastewater occurs in aeration basins, very large open-air tanks that hold the wastewater. Blowers force oxygen into the aeration basins to allow the biological degradation of the wastewater.

The aeration system is the main consumer of electricity in a wastewater treatment plant, accounting for up to 60 percent of a treatment facility's total energy use. The new aeration basins were designed to allow for varying inputs of oxygen with multiple blowers of various sizes. This optimizes the amount of oxygen input and related amount of electricity consumed by the aeration process. Overall savings of at least 5 percent from conventional aeration is expected.

did you know?

Treating and reclaiming wastewater is the largest energy consuming process of City operations. Plant operators have implemented measures to reduce peak electrical energy use, including intermittent operation of digester pumps. This and other operational changes have reduced electrical energy usage by approximately 7 percent.

16 IMPLEMENT GAS RECOVERY PROJECT AT LANDFILL

Since 1997, a portion of the gas generated at the Deans Bridge Road landfill has been collected and sent offsite to the Unimin Kaolin Mine. At the mine, the landfill gas is combusted in the flash drying equipment. However, due to reduced demand, not all of the collected landfill gas can be used during the year. The Unimin mine can combust up to 694 standard cubic feet per minute (scfm) of landfill gas. The landfill gas-collection system is capable of capturing approximately 2,000 scfm of landfill gas. The excess landfill gas, approximately 2,000 scfm is combusted in a flare.

Flaring reduces GHG emissions because the methane in the landfill gas converts into carbon dioxide. Each mole of methane gas combusted produces one mole of carbon dioxide. On an emission basis, one mole of methane emissions is equivalent to 21 moles of carbon dioxide emissions. This is because the global warming potential (GWP) of methane is 21 times greater than the GWP of carbon dioxide.

On an annual basis, not flaring the landfill gas saves 447,811 million Btus of energy. This would result in a reduction of 18,923 metric tons of CO_2 eq, an offset equivalent to taking 3,618 cars off the road. The City is evaluating alternate uses for the landfill gas including production of compressed gas for vehicle use or compressed gas for pipeline use.

17 INSTALL A SOLAR CAP ON LANDFILL

The City intends to evaluate ways in which renewable energy resources, such as solar and wind, can be harvested and projects can be implemented in county-owned facilities.

The City is evaluating the installation of flexible solar film on the cover of a closed landfill land. Section 2C of the landfill is approaching its design capacity and will be closed in the near future. As the landfill is closed, a final cover is installed to reduce fugitive landfill gas emissions, thereby reducing greenhouse gas emissions. The solar film could be used on top of the final cover to produce electrical energy.

With the amount of solar film that would fit into an acre of open landfill land, it is estimated that over 300,000 kWh could be produced per year. Additional opportunities include employing solar lights, or solar installations and small wind turbines at Recreation & Parks facilities.

18 DESIGN A RECLAIMED WATER INFRASTRUCTURE

Reclaiming water involves wastewater collection, treatment and reuse for beneficial purposes. Some uses include agricultural and landscape irrigation, industrial processes, toilet flushing, and replenishing a ground water basin. Water recycling can help reduce consumption of fresh supply of water from natural ecosystems. Other benefits include decreasing wastewater discharges and reducing and preventing pollution.

There are several possibilities for water reuse, from building a large infrastructure for reclaimed wastewater, to stormwater collection, and reuse at a small scale, such as with rain barrels and cisterns. Rainfall that has been collected from a roof or some other catchment area can be collected in rain barrels, cisterns, or manmade ponds to reuse the water for non-drinking purposes.

Today up to half of our drinking water is used on irrigation. Augusta intends to investigate ways to design a proper reclaimed water infrastructure to replace fresh water with reclaimed water for irrigation use.

strategy four

SUSTAINABLE POLICY, EDUCATION & OUTREACH

Strategy Four will be an opportunity for Augusta to lead by example by engaging active participation of City residents in activities that will lead the City to be a more sustainable place to live. As a result, this strategy will also offer new job opportunities and will help the City stimulate a new green economy thus improving the quality of life of Augusta's residents.

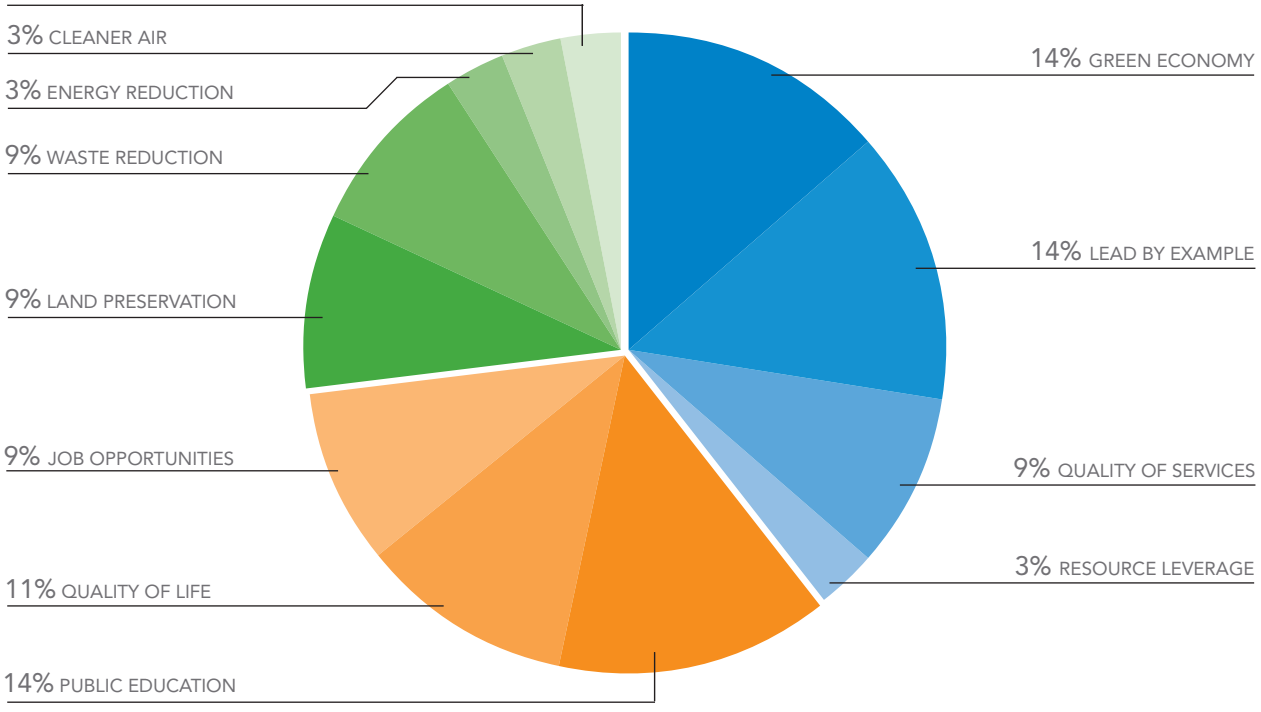
goals

- Create new jobs
- Lead by Example

actions

19. Review and Revise Code of Ordinances
20. Implement Green Cleaning Policy & Procedures
21. Establish a Recycling Program
22. Implement Green Printing Practices
23. Launch a Public Outreach Program

benefits: environment / economy / society



19 REVIEW AND REVISE CODE OF ORDINANCES

The Savannah River is the primary source of potable water for Augusta-Richmond County. Several ordinances and programs are in place to protect the water quality and minimize pollution, such as soil erosion and sedimentation ordinance, trees ordinance, stormwater management ordinance, etc.

There are some areas of the code and ordinances that can be modified to incentivize energy efficiency and conservation. Examples include the introduction of legislation to require minimum green building standards or to make it a voluntary option for residents and business owners, and update the code to the most stringent 2009 International Energy Conservation Code.

20 IMPLEMENT GREEN CLEANING POLICY & PROCEDURES

As more and more green cleaning supplies are introduced, it is becoming quite common to adopt Green Cleaning Policies and Procedures. Green cleaning directly produces environmental benefits by reducing the exposure to toxic chemicals for both human health and the environment. Energy reduction is an indirect benefit, given that most green cleaning products are produced in a more environmentally-friendly manner by using less energy or more energy efficient methods.

Augusta intends to establish and implement a green cleaning policy based on the EPA Green Cleaning Guidelines.[6]

Green cleaning strategies include focusing on air quality by destroying dirt and oil particles at the source, using cleaning materials that are more durable or biodegradable, and cleaning equipment that consume less energy and provide noise control.

[6]http://www.epa.gov/oppt/epp/pubs/cleaning.htm

21 ESTABLISH A RECYCLING PROGRAM

During 2007, residents within the City of Augusta-Richmond County on average disposed of 1.36 tons of waste per year or 7.45 pounds per person per day,[7] which was above the national average of 4.63 pounds per person per day for the same year.[8]

Augusta plans to improve the waste collection and recycling programs within the city/county service area by promoting recycling through informational flyers and additional forms of education, and by evaluating the use of an incentive based recycling collection program that could boost recycling rates while lowering waste disposal.

A waste stream analysis conducted with data from a 2005 Georgia Statewide Waste Characterization Study, shows that the landfill is composed of products that could be recycled, such as some form of paper product (28.0%), plastics (18.3%), or glass (5.3%). Collection of recyclables at the source in separate bins is a very effective way to engage the public, although single stream collection of all recyclables is also very common practice. In single stream recycling, recyclables are later separated at a sorting facility. At a minimum, recyclable materials should include paper, plastics, aluminum cans and glass, as well as other special recyclable items such as cardboard, batteries, or other electronic equipment.

Composting is the collection and natural processing of organic waste, including landscape waste, food scraps, etc. to produce a fertilizing byproduct usable for landscape purposes. There are several techniques for composting, such as vermicomposting or container composting, which can be accomplished in a home setting.

[7]Joint Solid Waste Management Plan 2009-2018, Resource Recycling Systems, October 2008

[8]http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2008rpt.pdf

22 IMPLEMENT GREEN PRINTING PRACTICES

The City of Augusta has approximately 1600 Desktops and 300 Laptop computers at different locations throughout the city/county facilities. Desktop printers are very common in offices. They have the advantage of being located right next to the individual who is printing, but they have limited features versus larger copier machines, and a number or disadvantages from an environmental perspective.

Typically, desktop printers do not include environmentally friendly features such as double-sided printing and other energy saving settings that are ordinary in large copier machines. By recognizing the sustainability value of a few centralized larger printers versus many desktop printers, Augusta plans to reduce the number of individual printers. As desktop printers are retired, they will be replaced with larger centralized ENERGY STAR®-labeled copier machines. To this end, the City of Augusta's IT Department has assembled the Living Green Committee leading green initiatives within the Department, with the goal of optimizing resources by implementing green practices in City offices.

Additional opportunities to minimize waste and utilize recycled materials can be found in the use of paper. Setting the print default on computers and other equipment so that print jobs automatically print on both sides of the page can cut the City's office paper use and costs in half. Recycled paper should be purchased instead of virgin paper. The most environmentally-friendly paper is one that has 100 percent post-consumer recycled content; it reduces the number of trees needed to make the paper and supports markets for paper collected for recycling. The cost premium for 100 percent recycled paper certified by the Forest Stewardship Council (FSC) is about 50 percent compared to 10 percent recycled paper, and about 15 percent compared to 35 percent recycled paper. If the cost premium of paper with 100 percent post-consumer is considered excessive, FSC-certified paper is also available at about 25 percent cost premium. FSC certification provides assurance that the fiber in the paper comes from forests that are managed to protect biodiversity and the livelihoods of the people that depend on them.

23 LAUNCH A PUBLIC OUTREACH PROGRAM

Augusta aims to actively seek and implement ways to conserve energy resources and help educate its residents in a way that provides "lead by example" programs that are readily seen, fun and cost effective. To this end, educating the public on energy conservation is paramount, and can be achieved by designing and implementing programs, contests, information promotions at recreation facilities, and conducting fun programs for kids to help the youth understand the need for energy conservation.

Additionally, the City plans to promote an Energy Conservation Month, in a way similarly to the promotions of "July" being National Recreation and Parks Month, and establishing an Employees Energy Efficiency Awareness Campaign so that City staff will be empowered to share information on City activities and goals with professional associations, local and regional workshops and schools.

Sibley Cotton Mills, 1903
© Library of Congress, Detroit Publishing Company, 1880-1920

conclusion

In a time when society is facing an unprecedented environmental and economic challenge on a local, regional, national, and global scale, the City of Augusta understands that environmental and economic concerns affect quality of life today and for generations to come. As a major employer, land owner, fleet operator and consumer of goods and services, the City of Augusta has a unique opportunity and capability to facilitate significant improvements in sustainable practices.

With this understanding, the City of Augusta has developed and is moving forward in the execution of its Energy Efficiency and Conservation Strategy (EECS), developed to guide local government, citizens, and businesses in meeting the City's goals to reduce total energy use and greenhouse gas emissions, conserve natural resources, and optimize the quality of services offered to the community.

In order to maximize sustainability efforts and achieve the above goals, the EECS includes 23 actions within 4 main strategies, selected for their environmental, economic, and social fabric benefits. These activities include executing energy efficiency improvements at major buildings and facilities and in the transportation sector, as well as enacting green policies and practices, educating residents, and stimulating a new green economy through evaluation and implementation of renewable energy projects.

All stakeholders – municipality, non-profits, business owners, and citizens – are called upon for action and participation towards a common goal. Through this document, the vision of a "clean, safe place to live, work and play" unfolds itself to its community by promoting responsible management and environmental stewardship.

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glossary

ORGANIZATIONS

ASHRAE	The **American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)** is an international technical society for all individuals and organizations interested in heating, ventilation, air-conditioning, and refrigeration (HVAC&R).
Augusta Tomorrow	**Augusta Tomorrow**, Inc. is a non-profit, private corporation. It is made up of members from private businesses, professional interests, the City of Augusta and the City of North Augusta. Augusta Tomorrow's mission is to serve the community at large by planning, promoting, and implementing the development of Augusta with particular emphasis on the city center. Augusta Tomorrow developed the 2009 Master Plan.
CARB	The **California Air Resources Board (CARB)**, part of the California Environmental Protection Agency, is dedicated to achieving emission reductions and is responsible for developing programs and strategies to reduce emissions in the state of California.
CSRA	The **Central Savannah River Area** is a 13 county region in east central Georgia including; Burke, Columbia, Glascock, Hancock, Jefferson, Jenkins, Lincoln, McDuffie, Richmond, Taliaferro, Warren, Washington and Wilkes counties.
CSRA RC	**Central Savannah River Area Regional Commission (CSRA RC)** is a public sector, non-profit planning and development agency that serves the eastern portion of Central Georgia. As the region's economic development district, CSRA RC provides economic development support to its member jurisdictions, including grant writing and administration services, strategic planning, and other technical assistance activities.
FHA	The **Federal Highway Administration** is an agency of the U.S. Department of Transportation whose mission is to improve mobility on the Nation's highways through national leadership, innovation and program delivery.
FSC	The **Forest Stewardship Council (FSC)** is a non-governmental organization established to promote the responsible management of the world's forests. FSC certification provides assurance that the fiber in the paper comes from forests that are managed to protect biodiversity and the livelihoods of the people that depend on them.
GBI	The **Green Building Initiative™ (GBI)** is a non-profit network of building industry leaders committed to bringing green to mainstream residential and commercial construction. By the end of 2004, the GBI brought the Canadian Green Globes® environmental assessment and rating tool into the U.S. market.

GEFA	The **Georgia Environmental Facilities Authority** assists communities in maintaining and improving public utilities by providing easily accessible low-interest loans and grants within the State of Georgia.
Governor's Energy Challenge	The Governor of Georgia has committed all state agencies to reduce energy consumption per square foot in state facilities 15 percent below FY2007 levels by 2020, and has challenged citizens, businesses and local governments to do the same by pledging through the **Governor's Energy Challenge.**
Green Seal®	**Green Seal®** is an independent, non-profit organization that provides science-based environmental certification standards to help manufacturers, purchasers, and end users make responsible choices. Hundreds of products and services are certified under the Green Seal standards in more than 40 categories.
GRI	The **Global Reporting Initiative (GRI)** is an international sustainability reporting standard used by leading organizations to measure and report their environmental, economic, and social performance.
ICLEI	Formerly known as International Council for Local Environmental Initiatives, **ICLEI** is an international membership association of local governments dedicated to climate protection and sustainable development. Established in 1990 as the International Council for Local Environmental Initiatives, the official name is now ICLEI-Local Governments for Sustainability. ICLEI provides its members with tools and resources to achieve reductions in greenhouse gas emissions and create more sustainable communities.
ICMA	Founded in 1914, the **International City/County Management Association (ICMA)** is the premier local government leadership and management organization. Its mission is to create excellence in local governance by advocating and developing the professional management of local government worldwide.
TIES	The **International Ecotourism Society (TIES**) is a nonprofit organization dedicated to promoting ecotourism. Founded in 1990, TIES has been in the forefront of the development of ecotourism, providing guidelines and standards, training, technical assistance, research and publications.
U.S. DOE	The **U.S. Department of Energy (U.S. DOE)** contributes to the future of the Nation by ensuring energy security, maintaining the safety, security and reliability of the nuclear weapons stockpile, cleaning up the environment from the legacy of the Cold War, and developing innovations in science and technology.
U.S. EPA	The **U.S. Environmental Protection Agency (U.S. EPA)** leads the nation's environmental science, research, education and assessment efforts. The mission of the EPA is to protect human health and the environment. Since 1970, EPA has been working for a cleaner, healthier environment for the American people.
USGBC	The **United States Green Building Council (USGBC)** is a national non-profit organization developer of the Leadership in Energy and Environmental Design (LEED) rating system and certification.

PROGRAMS

ARRA	The **American Recovery and Reinvestment Act (ARRA)** is an economic stimulus package enacted by the 111th U.S. Congress in February 2009. The Act includes federal tax cuts, expansion of unemployment benefits and other social welfare provisions, and domestic spending in education, health care, and infrastructure, including the energy sector. The Energy Efficiency and Conservation Block Grant (EECBG) Program was funded for the first time through the ARRA.
ARTS	The **Augusta Regional Transportation Study (ARTS)** includes the urbanized portions of Aiken County South Carolina, and Columbia and Richmond Counties in Georgia. ARTS requires involvement by policymakers, technical staff, and citizens to address the various aspects of the transportation planning process.
CACP	The **Clean Air & Climate Protection (CACP)** software is a one-stop emissions management tool that calculates and tracks emissions and reductions of greenhouse gases (carbon dioxide, methane, nitrous oxide) and criteria air pollutants (NOx, SOx, carbon monoxide, volatile organic compounds, PM10, PM 2.5) associated with electricity, fuel use, and waste disposal. The software is available to ICLEI members, an international association of local governments.
EECBG	The **Energy Efficiency and Conservation Block Grant (EECBG) Program**, authorized by the Energy Independence and Security Act of 2007 (EISA) and signed into Public Law on December 19, 2007, provides funds to units of local and state government, Indian tribes, and territories to develop and implement projects to improve energy efficiency and reduce energy use and fossil fuel emissions in their communities. The program is administered by the U.S. Department of Energy (DOE). The EECBG Program was funded for the first time in 2009 under the American Recovery and Reinvestment Act (ARRA).
EECS	The **Energy Efficiency and Conservation Strategy (EECS)** is a requirement for the grantees of the EECBG Program to develop a long-term strategic plan to achieve energy efficiency and greenhouse gas reduction goals. The energy efficiency and conservation strategy becomes the road-map for detailing priorities, setting goals, and establishing objectives.
ENERGY STAR®	**ENERGY STAR®** is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping consumers save money and protect the environment through energy efficient products and practices. More than 60 product categories are labeled ENERGY STAR®.
EPEAT®	**EPEAT®** is a system that helps purchasers in the public and private sectors evaluate, compare and select electronic products based on their environmental attributes. The system currently covers desktop and laptop computers, thin clients, workstations and computer monitors.
EPP	**Environmentally Preferable Purchasing (EPP) Program** was created by the U.S. EPA in 1993 to help the federal government "buy green," and in doing so, uses the federal government's enormous buying power to stimulate market demand for green products and services.

Green-e	A program of the Center for Resource Solutions, **Green-e** is the nation's leading independent consumer protection program for the sale of renewable energy and greenhouse gas reductions in the retail market. Green-e offers certification and verification of renewable energy and greenhouse gas mitigation products.
Green Globes®	**Green Globes®** is a green building guidance and assessment program for commercial buildings. It uses software tools and ratings/certification system to ensure that environmental impacts are comprehensively assessed on a 1,000 point scale in multiple categories.
Greenspace Program	Adopted by the Augusta Commission in 2000 and updated in 2002, the **Greenspace Program** is designed to preserve up to 20 percent of the city's land area as greenspace. The objective is to protect land along the Savannah River and all major creeks in the county.
ISO 14001:2004	Released in 2004 by the International Organization for Standardization, **ISO 14001:2004** is the international recognized standard for Environmental Management Systems (EMS). An EMS meeting the requirements of ISO 14001:2004 is a management tool enabling an organization of any size or type to identify and control the environmental impact of its activities, products or services; improve its environmental performance continually; implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.
LEED	**Leadership in Energy and Environmental Design** LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.
LOS	**Level of service (LOS)** is a measure used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways, but the concept has also been applied to intersections, transit, and water supply. The transportation LOS system uses the letters A through F, with A being best and F being worst.
Portfolio Manager	ENERGY STAR® **Portfolio Manager** is an interactive energy management tool used to track and assess energy and water consumption across a portfolio of buildings. Portfolio Manager helps owners and property managers set energy savings priorities, and verify and track improvements over time.

OTHER DEFINITIONS

Carbon Credits	**Carbon credits** are key components of national and international attempts to mitigate the growth in concentrations of greenhouse gases. One carbon credit is equal to one ton of carbon dioxide, or in some markets, carbon dioxide equivalent gases. Carbon trading is an application of an emissions trading approach. Greenhouse gas emissions are capped and then markets are used to allocate the emissions among the group of regulated sources.
Carbon Footprint	A **Carbon Footprint** is the total set of greenhouse gas emissions caused by an organization, event or product. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide equivalent.
Carbon Offset	**Carbon offset** is a financial instrument aimed at a reduction in greenhouse gas emissions. Carbon offsets are measured in metric tons of carbon dioxide-equivalent (Mt CO2 eq) and may represent six primary categories of greenhouse gases. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases.
Carbon Sequestration	**Carbon sequestration** provides for the long-term storage of carbon, specifically carbon dioxide gas, and mitigates emissions of greenhouse gases resulting from fossil fuel consumption. There are several techniques for sequestration of carbon dioxide through biological, chemical, or physical processes. Reforestation, or planting trees, uses a biological process to transfer carbon dioxide from the atmosphere to the trees. Trees and plants absorb carbon dioxide, release the oxygen and store the carbon.
CO_2	**Carbon Dioxide (CO_2)** is a naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.
CO_2 eq	**Carbon Dioxide Equivalent (CO_2 eq)** is a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed in metric tons of carbon dioxide equivalents (Mt CO_2 eq). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.
Cx and RCx	**Commissioning (Cx) and Retro-commissioning (RCx)** are systematic processes for improving the energy efficiency and operation of a building. The Cx and RCx procedures are typically performed by an organization hired by the building owner to make sure that the building systems are installed and are operating as designed and according to the owner's requirements.

Eco-tourism	**Eco-tourism** activities are those that minimize the environmental impact, nurture cultural awareness and respect, and provide social and financial benefits for local people. An inherent characteristic of eco-tourism is the promotion of energy and water conservation, land preservation, air quality and creation of economic opportunities for local communities.
EMS	**Environmental Management System (EMS)** is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. An internationally recognized EMS standard is ISO 14001:2004.
Energy Audit	An **Energy Audit** is an inspection, survey and analysis of energy flows for energy conservation in a building, process, or system to reduce the amount of energy input into the system without negatively affecting the output. ASHRAE identifies three levels of energy audits requiring deeper level of analysis: Level I-Walkthrough Assessment, Level II-Energy Survey and Analysis, Level III- Investment-grade Audit.
GIS	**Geographic Information System (GIS)** is any system that captures, stores, analyzes, manages, and presents data that are linked to location.
GHG	**Greenhouse gases (GHG)** are gases in an atmosphere that absorb and emit radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The main greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons. Increased concentration level of greenhouse gases due to both natural and anthropogenic activities is known as a cause of global warming, ozone depletion, and climate change.
GHG Inventory	A **Greenhouse Gas Inventory** is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specific period of time (e.g. one year).
GWP	**Global Warming Potential (GWP)** is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming. It is a relative scale which compares the gas in question to that of the same mass of carbon dioxide (whose GWP is by convention equal to 1). A GWP is calculated over a specific time interval and the value of this must be stated whenever a GWP is quoted or else the value is meaningless.
REC	**Renewable Energy Certificates (RECs)**, also known as Green tags, Renewable Energy Credits, Renewable Electricity Certificates, or Tradable Renewable Certificates (TRCs), are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource (renewable electricity).
Urban Heat Island	**Urban Heat Island** refers to an urban location that is hotter than the surrounding rural setting due to the thermal properties of surface materials such as roofs and pavements, which store heat during the day and radiate it over time.

OTHER ABBREVIATIONS

APT	Augusta Public Transit
CV	Constant Volume
CY	Calendar Year
EER	Energy Efficiency Rating
EH&S	Environmental, Health and Safety
FY	Fiscal Year
Gal	Gallon
HPS	High Pressure Sodium
HVAC	Heating, Ventilation, and Air Conditioning
kW	Kilowatt
kWh	Kilowatt-hour
LED	Light Emitting Diodes
MGD	Million Gallons per Day
MMBtu	Million British Thermal Unit
Mt	Metric Tons
PLC	Programmable Logic Controllers
SCADA	Supervisory Control and Data Acquisition
SEER	Seasonal Energy Efficiency Rating
TIP	Traffic Improvement Program
VAV	Variable-air-Volume
VOC	Volatile Organic Compounds

appendix a

ID	Project Title	Electricity Saved [kWh]	Natural Gas Saved [therms]	Gasoline Saved [gal]	Annual Energy Cost savings [$]	GHG Emissions Reduced [Mt CO_2 eq]	Jobs retained	EECBG Funds [$]	Other Funds [$]	Total Budget [$]
1	**ENERGY EFFICIENT BUILIDNGS AND FACLITIES**									
1a	Replace HVAC systems @ Julian Smith Casino - HVAC Equipment and Ductwork	39,305	-	-	$ 4,324	28.2	3.9	$ 357,236	$ -	$ 357,236
1b	Replace HVAC systems @ Julian Smith Casino - Split System A/C units	8,346	-	-	$ 918	6.0	0.1		$ 9,125	$ 9,125
2	Replace A/C unit @ Aquatic Center	46,372	-	-	$ 5,101	33.3	0.7		$ 59,400	$ 59,400
3a	Upgrade Mechanical Systems @ Municipal Building - Air Handling Unit Motors	4,578	-	-	$ 504	3.3	0.0		$ 3,500	$ 3,500
3b	Upgrade Mechanical Systems @ Municipal Building - Control Strategies for AHU VFDs	50,051			$ 5,506	35.9	TBD		TBD	TBD
3c	Upgrade Mechanical Systems @ Municipal Building - Hot Water Heater Recirculation Pump	546	920	-	$ 980	5.0	TBD		$ 300	$ 300
3d	Upgrade Mechanical Systems @ Municipal Building - Toilet Exhaust Fans Night Shut-Off	16,754	-	-	$ 1,843	12.0	0.0		$ 1,000	$ 1,000
4	Tie HVAC systems into the Municipal Building central plant	29,006	-	-	$ 3,191	20.8	0.0	$ 265,066		$ 265,066
5	Upgrade HVAC units throughout the county buildings	266,823	-	-	$ 29,351	191.6	0.0	$ 226,742		$ 226,742
6a	Implement Lighting Retrofit Projects - Outdoor Recreation Facilities	TBD			TBD	TBD	TBD			TBD
6b	Implement Lighting Retrofit Projects - Aquatic Center	46,153			$ 5,077	33.1	0.1		$ 4,840	$ 4,840
6c	Implement Lighting Retrofit Projects - Municipal Building	198,244			$ 21,807	142.3	0.6		$ 57,300	$ 57,300
7	Install Occupancy Sensors on Vending Machines	5,992			$ 659	4.3	0.0		$ 1,350	$ 1,350
2	**TRANSPORTATION**									
1	Install LED Traffic Signals	668,338	-	-	$ 73,517	479.9	2	$ 193,927		$ 193,927
2a	Install Adaptive Traffic Signal System - Fort Gordon Gates	-	-	19,167	$ 49,833	170.4	1	$ 62,241		$ 62,241
2b	Install Adaptive Traffic Signal System - Wrightsboro Rd	-	-	92,000	$ 239,200	817.9	3	$ 244,961		$ 244,961
2c	Install Adaptive Traffic Signal System - Washington Rd	-	-	172,500	$ 448,500	1,533.5	5	$ 459,304		$ 459,304
3	**RENEWABLE ENERGY**									
2	Implement Gas Recovery Project at Landfill	-	121,857		$ 121,857	667.8	-			$ -

resource inventory

RENEWABLE ENERGY TECHNOLOGIES

Renewable Electricity Production Tax Credit (PTC)

The Renewable Electricity Production Tax Credit (PTC) is provided by the IRS and is a per-kilowatt-hour tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year. Eligible projects include landfill gas, wind, biomass, hydroelectric, geothermal electric, municipal solid waste, hydrokinetic power (i.e. flowing water), anaerobic, digestion, small hydroelectric, tidal energy, wave energy, ocean thermal. This program is issued for commercial and industrial. The wind tax credit expires on **December 31, 2012**, closed-loop biomass, open-loop biomass, geothermal energy, landfill gas, municipal solid waste, qualified hydroelectric, marine and hydrokinetic expires **December 31, 2013**. www.irs.gov/pub/irs-pdf/f8835.pdf.

Renewable Energy Production Incentive (REPI)

The Renewable Energy Production Incentive (REPI) is provided by the U.S. DOE. It provides financial incentive payments for electricity generated and sold by new qualifying renewable energy generation facilities. Eligible projects include solar, wind, geothermal, biomass, landfill gas, livestock methane, ocean (including tidal, wave, current, and thermal), fuel cells using hydrogen derived from eligible biomass facilities. This program is issued for Tribal Governments, Municipal Utility, Rural Electric Cooperative, State/local government that sell product's electricity. Applications are accepted **between October 1 and December 31st of each year**. http://apps1.eere.energy.gov/repi/about.cfm.

Landfill Methane Outreach Program (LMOP)

The Landfill Methane Outreach Program (LMOP) is provided by the EPA and is a voluntary assistance program that helps to reduce methane emissions from landfills by encouraging the recovery and use of landfill gas as an energy resource. Eligible projects include landfill gas. This program is issued for communities, landfill owners, utilities, power marketers, states, project developers, tribes, and non-profit organizations. http://www.epa.gov/lmop.overview.htm.

Georgia Clean Energy Property Tax Credit

The Georgia Clean Energy Property Tax Credit is provided by the Georgia Environmental Facilities Authority (GEFA) and is a tax credit for certain types of energy efficiency and renewable energy property as well as for the delivery of wood residuals to qualified biomass facilities. Eligible projects include Renewable Energy: solar photovoltaic panels and thermal electric systems, solar thermal systems, wind systems, biomass facilities; Energy Efficiency: Energy star qualified geothermal heat pump systems, lighting retrofit projects, and energy efficient buildings. Application deadline is **December 31, 2012**. http://www.gefa.org/index.aspx?page=423

Clean Energy Tax Credit

The Clean Energy Tax Credit is provided by Georgia State and is a program where personal and corporate tax credits for renewable energy equipment and certain energy-efficient equipment are installed and placed into service. Eligible projects include lighting, lighting controls/sensors, comprehensive measures/whole building solar water heat, solar space heat, solar thermal electric, solar thermal process heat, photovoltaics, wind, biomass, geothermal heat pumps, and daylighting. This program is issued for commercial, industrial, multi-family, residential, and agricultural. Tax credit expires **December 31, 2012.** www.gefa.org/index.aspex?page=423.

Clean Energy Property Rebate Program

The Clean Energy Property Rebate Program is provided by Georgia State and is a program that provides rebates for investments in renewable energy and energy efficiency programs. Eligible projects include solar water heat, solar space heat, solar thermal process heat, photovoltaics, wind, geothermal heat pumps, and day lighting. This program is issued for commercial, nonprofit, and schools. Date Effective: 5/22/09. Funding for this program is available on a first-come, first-served basis. As of October 20, 2009, GEFA has received applications for funding in excess of the $4,495,000 available for this program. While any new applications received after this date will be added to the waiting list, it is unlikely that new applications will be funded. Applicants may still be eligible to apply for the Clean Energy Property Tax Credit. http://www.gefa.org/Index.aspx?page=489.

Business Energy Investment Tax Credit (ITC)

The Business Energy Investment Tax Credit (ITC) is provided by Energy Star and IRS and is a program where businesses receive tax credit for implementing certain eligible systems. Eligible projects include solar water heat, solar space heat, solar thermal electric, solar thermal process heat, photovoltaics, wind, biomass, geothermal electric, fuel cells, geothermal heat pumps, CHP/Cogeneration, solar hybrid lighting, direct-use geothermal, and micro turbines. This program is issued for commercial, industrial, and utility. Credits are available for eligible systems placed in service on or before **December 31, 2016.** www.irs.org.

Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation

The Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation is provided by the IRS Stimulus Act of 2008 and is a program where businesses may recover investments in certain property through depreciation deductions. Eligible projects include solar water heat, solar space heat, solar thermal electric, solar thermal process heat, photovoltaics, landfill gas, wind, biomass, renewable transportation fuels, geothermal electric, fuel cells, CHP/Cogeneration, solar hybrid lighting, direct use geothermal, anaerobic digestion, and micro turbines. This program is issued for commercial, and industrial. Eligible projects placed in service **after September 8, 2010 and before January 1, 2012** qualifies for 100% first-year bonus depreciation. For 2012, bonus depreciation is still available, but the allowable deduction reverts from 100% to 50% of the eligible basis. www.irs.com.

Renewable Energy Grant

The Renewable Energy Grant is provided by U.S. Department of Treasury and is a grant issued for qualified renewable energy property. Eligible projects include: Solar water heat, Solar space heat, Solar thermal electric, Solar thermal process heat, Photovoltaics, Landfill gas, Small wind up to 100 kW, Biomass, Hydroelectric, Geothermal electric, Fuel cells, Geothermal heat pumps, Municipal solid waste, CHP/cogeneration, Solar hybrid lighting, Hydrokinetic, Anaerobic digestion, Tidal energy, Wave energy, Ocean thermal, Micro turbines. This program is issued to commercial, industrial, and agricultural industries. Application deadline is **October 1, 2012.** www.treas.gov/recovery/1603.shtml.

Rural Energy for America Program (REAP)

The Rural Energy for America Program (REAP) is provided by the USDA and provides grant and loan guarantees for energy efficiency and renewable energy for agricultural producers and rural small businesses. Eligible projects include: Energy audits and renewable energy development assistance, Solar water heat, Solar space heat, Solar thermal electric, Photovoltaics, Wind, Biomass, Hydroelectric, Renewable transportation fuels, Geothermal electric, Geothermal heat pumps, CHP/cogeneration, Hydrogen, Direct-use geothermal, Anaerobic digestion, Small hydroelectric, Tidal energy, Wave energy, Ocean thermal, Renewable fuels, Fuel cells using renewable fuels, and Micro turbines. This project is issued for commercial, schools, local government, state government, tribal government, rural electric cooperative, agricultural, public power entities. Application deadline for the next cycle has not yet been released. www.rurdev.usda.gov/rbs/busp/bprogs.htm.

Loan Guarantee Program

The Loan Guarantee Program is provided by the U.S. DOE and provides loans to encourage early commercial use in the United States of new or significantly improved technologies in energy projects. Eligible projects include: Solar thermal electric, Solar thermal process heat, Photovoltaics, Wind, Hydroelectric, Renewable transportation fuels, Geothermal electric, fuel cells, manufacturing facilities, daylighting, tidal energy, wave energy, ocean thermal, and biodiesel. This program is issued to commercial, industrial, non-profit, schools, local government, state government, agricultural, institutional, any non-federal entity. There is an open solicitation for Energy Efficiency, Renewable Energy and Advanced Distribution Technologies for which construction on eligible projects must begin by **September 30, 2011.** https://apply.loanprograms.energy.gov/doe/common/Pages/MoreInfo.aspx.

Qualified Energy Conservation Bonds (QECBs)

The Qualified Energy Conservation Bonds (QECBs) are provided by the IRS and are tax credit bonds where the investor receives a tax credit instead of interest. The investor tax credit is expected to result in an interest rate subsidy to the borrower of 70 percent. Eligible projects include: Solar thermal electric, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, municipal solid waste, hydrokinetic power, anaerobic digestion, tidal energy, wave energy, and ocean thermal. This program is issued for local governments, state governments, and tribal governments. No application deadline has been indicated. www.gefa.org/index.asp?page=487.

ENERGY EFFICIENCY RETROFITS

Energy Efficient Commercial Buildings Tax Deduction

The Energy Efficient Commercial Buildings Tax Deduction is provided by Federal Government, Energy Star/IRS, NEMA, and NRDC and is a program designed to reduce the initial cost of investing in energy-efficient lighting and other building systems via an accelerated tax deduction. Allows building owners (or tenants) to write-off the complete cost of upgrading a building's indoor lighting, HVAC/hot water and building envelope in the year the new equipment is placed in service. Eligible projects include equipment insulation, water heaters, lighting, lighting controls/sensors, chillers, furnaces, boilers, heat pumps, air conditioners, CHP/Cogeneration, caulking/weather stripping, duct/air sealing, building insulation, windows, doors, siding, and roofs. This program is issued for commercial and construction. Property must be placed in service prior to **January 1, 2014.** www.efficientbuildings.org.

ENERGY STAR® New Home Builder Rebate Program

The ENERGY STAR New Home Builder Rebate Program is provided by Georgia Power and is a program that gives incentives for home builders to construct new homes which meet ENERGY STAR guidelines. Builders constructing new efficient homes in Georgia Power's service territory which utilize electric heating and water heating can receive a $300 incentive to help with the cost of having the home rated. Eligible projects include comprehensive measures or whole building. This program is issued for installers and contractors. There is no application deadline specified for this program. https://customersercice.southerncompany.com/builder/EnergyStar.aspx.

Energy Efficiency Home Improvement Rebate Program

The Energy Efficiency Home Improvement Rebate Program is provided by Georgia Power and is a program where Georgia Power offers $1900 in rebates to customers who hire "Home Performance with Energy Star Contractors" to make energy efficiency home improvements. Eligible projects include equipment insulation, programmable thermostats, duct/air sealing, and building insulation. This program is issued for residences. There is no application deadline specified for this program. www.georgiapower.com/energystar/home_rebates.asp.

Low-Income Weatherization Assistance Program

The Low-Income Weatherization Assistance Program is provided by GEFA and is a program designed to reduce state and national consumption of energy while providing a safe, improved environment and enhanced quality of life for Georgia's income eligible households. Eligible projects are for low-income individuals with income eligible households. This program is issued to community action agencies, city and city government entities, and non-profit agencies. No application deadline is indicated. www.gefa.org/index.aspx?page=68

Energy Efficient Mortgages

The Energy Efficient Mortgages program credits a home's energy efficiency in the mortgage. Eligible projects include: Passive solar space heat, solar water heat, solar space heat, photovoltaics, and daylighting. This program is issued for residential. No application deadline is indicated. www.resnet.us/ratings/mortgages.

Innovation Energy Efficiency, Renewable Energy and Advanced Transmission, and Distribution Technologies

The Innovation Energy Efficiency, Renewable Energy and Advanced Transmission, and Distribution Technologies is provided by U.S. DOE Loan Guarantee Program and is authorized to offer more than $10 billion in loan guarantees for energy efficiency, renewable energy and advanced transmission and distribution projects. Eligible projects include: Projects that employ innovative energy efficiency, renewable energy, and advance transmission and distribution technologies and advanced biofuels; new or significantly-improved technology relative to commercial technology in service in the US that avoid, reduce, or sequester air pollutants or anthropogenic emissions of GHGs, and create jobs. To qualify, construction on eligible projects must begin by **September 30, 2011.** https://apply.loanprograms.energy.gov/doe/common/Pages/MoreInfo.aspx.

Qualified Energy Conservation Bonds (QECBs)

The Qualified Energy Conservation Bonds (QECBs) are provided by the IRS and are tax credit bonds where the investor receives a tax credit instead of interest. The investor tax credit is expected to result in an interest rate subsidy to the borrower of 70 percent. Eligible projects include: Solar thermal electric, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, municipal solid waste, hydrokinetic power, anaerobic digestion, tidal energy, wave energy, and ocean thermal. This program is issued for local governments, state governments, and tribal governments. No application deadline has been indicated. www.gefa.org/index.asp?page=487.

TRANSPORTATION

Smart Way Clean Diesel Finance Program

The Smart Way Clean Diesel Finance Program is provided by the Environmental Protection Agency (EPA) and issues competitive grants to establish national low-cost revolving loans or other financing programs that help fleets reduce emissions and uses cooperative agreements to establish innovative finance programs for buyers of eligible diesel vehicles and equipment. Eligible projects include: purchase or retrofit of buses, medium or heavy duty trucks, marine engines, locomotives, non-road engines or vehicles used in construction, handling of cargo, agriculture, mining, and energy production. This program is issued for U.S. regional, state, local, or tribe agencies or port authorities with jurisdiction over transportation of air quality. The program application deadline is **February 10, 2011.** www.epa.gov/otaq/diesel/prgfinance.htm

Alternative Fuel Infrastructure Tax Credit

The Alternative Fuel Infrastructure Tax Credit is provided by the Department of Energy (DOE) and gives a tax credit for the cost of installing alternative fueling equipment that have been placed into service after December 31, 2005. The tax incentive ends **December 31, 2011** for eligible fuel types consisting of natural gas, liquefied petroleum gas, electricity, E85, or diesel fuel blends containing a minimum of 20% biodiesel. January 1, 2015 is the deadline for hydrogen fueling equipment. This tax credit is issued for corporate or personal operations. http://www.afdc.energy.gov/afdc/laws/law/US/351.

Job Access and Reverse Commute Program

The Job Access and Reverse Commute Program is provided by the Federal Transit Association (FTA) and the State of Georgia and provides funding for local programs that offer job access and reverse commute services to provide transportation for low-income individuals who may live in the city core and work in suburban locations. Eligible projects include capital planning and operating expenses for projects that transport low-income individuals to and from jobs and activities related to employment, and for reverse commute projects. This program is issued for states and public bodies, private non-profit organizations, state or local governments, and operators of public transportation services including private operators of public transportation services. There is no application deadline for this program. www.fta.dot.gov/grants_financing_3550.html.

Large Urban Cities Program

The Large Urban Cities Program is provided by the FTA and the State of Georgia and is a program for urbanized areas and Governors to use funds for transit capital and operating assistance in urbanized areas and for transportation related planning. Eligible projects include planning, engineering design and evaluation of transit projects and other technical transportation-related studies, capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention, and security equipment and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guide way systems including rolling stock, overhaul and rebuilding vehicles, track, signals, communications, and computer hardware and software. All preventative maintenance and some Americans with Disabilities Act complementary paratransit service are considered capital costs. This program is issued for public bodies with the legal authority to receive and dispense Federal Funds. Governors, responsible local officials, and publicly owned operators of transit services are to designate a recipient to apply for, receive, and dispense funds for transportation management areas. There is no application deadline for this program. www.fta.dot.gov/grants_financing_3561.html.

Bus & Bus Facilities Program

The Bus & Bus Facilities Program is provided by the FTA and is a program that provides capital assistance for new and replacement buses, related equipment, and facilities. Eligible projects include: The acquisition of vehicles for fleet and service expansion, including clean fuel vehicles; rehabilitation of buses; Maintenance and administrative facilities; Transfer facilities, bus malls, transportation centers, intermodal terminals, and park-and-ride facilities; Intercity bus stations and terminals that are part of joint development projects in accordance with FTA guidance; Acquisition of replacement vehicles and bus rebuild; Passenger amenities such as passenger shelters and bus stop signs; Accessory and miscellaneous equipment such as mobile radio units, supervisory vehicles; Intelligent Transportation Systems (ITS); Ferry vessels & facilities; Costs incurred in arranging financing for eligible projects under the bus category as a reimbursement; and Fixed guide way bus projects. This program is issued for state and local governments. Funds are available for obligation during the fiscal year of appointment plus two years (i.e. funds apportioned in FY08 are available until the end of FY 2010). www.fta.dot.gov (under Grants & Financing/Grant Programs/Bus & Bus Facilities)

Clean Fuels Program

The Clean Fuels Program is provided by the FTA and is a program developed to assist nonattainment and maintenance areas in achieving or maintaining the National Ambient Air Quality Standards for ozone and carbon monoxide, and supports emerging clean fuel and advanced propulsion technologies for transit buses and markets for those technologies. Eligible projects include: Purchasing or leasing clean fuel buses and constructing new or improving public transportation facilities to accommodate clean fuel buses; Constructing or leasing clean fuel buses or electrical recharging facilities and related equipment for such buses; Constructing new or improved existing public transportation facilities to accommodate clean fuel buses; May include projects located in nonattainment or maintenance areas relating to clean fuel, bio-diesel, hybrid electric, or zero emissions technology buses that inhibit equivalent or superior emissions reductions to existing clean fuel or hybrid electric technologies. This program is issued for designated recipients for urbanized areas with a population of 200,000 or more. An eligible recipient operates in an area that is either a nonattainment area or a maintenance area for ozone or carbon monoxide. Funds are available for obligation during the fiscal year of appointment plus two years (i.e. funds apportioned in FY08 are available until the end of FY 2010). www.fta.dot.gov (under Grants & Financing/Grant Programs/Clean Fuels Grant Program)

National Clean Diesel Finance Program

The National Clean Diesel Finance Program is provided by the EPA and is funding to reduce emissions from existing diesel engines through strategies including add-on emission control retrofit technologies, idle reduction technologies, cleaner fuel use, engine repowers, engine upgrades, and/or vehicle or equipment replacement; and the creation of innovative finance programs to fund diesel emissions reduction projects. Eligible projects include: Buses, medium or heavy duty trucks, marine engines, locomotives, non-road engines or vehicles used in construction, handling of cargo, agriculture, mining, energy production. Funding restricted to the use of EPA and California Air Resources Board (CARB) verified and certified diesel emission reduction technologies. Application deadline was **January 13, 2011;** however, program is renewed yearly. www.epa.gov/otaq/diesel/prgnational.htm#rfp.

Heavy-Duty Hybrid Electric Vehicle (HEV) Tax Credit

The Heavy-Duty Hybrid Electric Vehicle (HEV) Tax Credit is provided by the IRS and is four separate credits for different types of energy efficient vehicles. Eligible projects include: Qualified heavy-duty HEVs with a gross vehicle weight rating of more than 8,500 pounds. Applies only to vehicles acquired before **January 1, 2010.** http://afdc.energy.gov/afdc/progs/view_ind_fed.php/afdc/394/0.

SOLID WASTE

Solid Waste Management Grant

The Solid Waste Management Grant is provided by the USDA. The program's objectives are to 1) reduce or eliminate pollution of water resources in rural areas; 2) improve planning and management of solid waste sites in rural areas. Eligible projects include: Evaluate landfill conditions to determine threats to water resources; Provide technical assistance and/or training to enhance operator skills in the operation and maintenance of active landfills; Provide technical assistance and/or training to help communities reduce the solid waste stream; Provide technical assistance and/or training for operators of landfills which are closed or will be closed in the near future with the development and implementation of closure plans, future land use plans, safety and maintenance planning, and closure scheduling within permit requirements. This program is issued for non-profit organization that have been granted tax exempt status by the Internal Revenue Service (IRS); and public bodies including local government-based multijurisdictional organizations. Application deadlines are **from October 1 through December 31 of each calendar year.** www.usda.gov/rus/water/SWMG.htm.

Solid Waste Loan

The Solid Waste Loan is provided by GEFA and is a low-interest loan of up to $3 million. The program is similar to Georgia's water and sewer program policies and has a maximum repayment period of 20 years. Eligible projects include: Solid waste capital projects that service local governments; finance new subtitle D landfills, expansions and closures and landfill methane gas collection systems. This program is issued to local governments. No application deadline has been identified.

Georgia Fund Program – Water and Sewer Financing

The Georgia Fund Program – Water and Sewer Financing is provided by GEFA and is a program for water, wastewater, and solid waste infrastructure projects. Fund Programs include: Construction Funding, Environmental Emergency Loans, Public Sewer Grant Program, and Solid Waste Loans. Eligible projects include: water and sewer lines, treatment plants, pumping stations, wells, water storage tanks and water meters. This program is issued to local governments. There is no application deadline for this program. www.gefa.org/index.aspx?page=78

EDUCATION AND OUTREACH

Environmental Education Grant

The Environmental Education Grant is provided by the EPA and is a grant that is awarded annually based on funding appropriated by Congress. Eligible projects include: projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. RFPs for the 2011 Environmental Education grants program are expected to be made available in February.

Robert Woodruff Foundation, Inc

The Robert Woodruff Foundation, Inc is an independent foundation with a broad charter to support charitable scientific and educational activities. Eligible projects include: elementary, secondary, and higher education, health care and education, human services (particularly for children and youth), economic development and civic affairs, conservation of natural resources and environmental education. This program is issued to tax-exempt public charities and selected governmental agencies located and operating in Georgia. No application deadline is indicated. www.woodruff.org/grant.

COMMUNITY DEVELOPMENT

Community Development Block Grant Program – Entitlement Communities Program

The Community Development Block Grant Program – Entitlement Communities Program is provided by the U.S. Department of Housing and Urban Development (HUD) and is a program that allocates annual grants to larger cities and urban counties to develop viable communities provided by decent housing, a suitable living environment, and opportunities to expand economic opportunities, principally for low-and moderate-income persons. Eligible projects include: Acquisition of real property; Relocation and demolition; Rehabilitation of residential and non-residential structures; Construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes; Public services; Activities relating to energy conservation and renewable energy resources; and Provision of assistance to profit-motivated businesses to carry out economic development and job creation/retention activities. This program is issued for principle cities of Metropolitan Statistical Areas, other metropolitan cities with populations of at least 50,000, and qualified urban counties with population of at least 200,000. No application deadline is indicated. www.hud.gov/utilities

Coca-Cola Foundation Inc

The Coca-Cola Foundation Inc creates and supports initiatives and programs that respond in a meaningful way to community needs and local communities. Eligible projects include: Water Stewardship (to support clean access and sanitation, watershed protection in water-stressed regions, utilization of water for production and or multiple use systems that do more that provide clean drinking water, education, and awareness programs that promote water conservation within communities and industry), Health and Active Lifestyles (To support access to exercise, physical activity and nutritional education programs, programs that motivate behavior modification, and programs that encourage lifestyle/behavioral changes), Community Recycling (to increase liter abatement efforts, advance recovery and reuse, increase community recycling awareness, and support research and innovation), Education (to support scholarships, school drop-out prevention, access to education programs, and other education initiatives, per local business unit priorities). This program is issued to local communities. No application deadline is indicated. www.thecoca-colacompany.com/citizenship/foundation_coke.html.

UPS Foundation

The UPS Foundation is an employee-driven foundation where through locally driven Community Involvement Committees, they encourage their employees to make recommendations to support organizations where they are involved as volunteers rather than select unsolicited grant proposals. Eligible projects include: Economic and Global Literacy, Environmental Sustainability, Nonprofit Effectiveness, Diversity, and Community Safety. This program is issued local charitable organizations that align with the Foundation's Strategy as outlined in its five focus areas mentioned above. No application deadline is indicated. http://responsibility.ups.com/foundation/index.html.

Turner Foundation

The Turner Foundation is a private independent family foundation committed to preventing damage to the natural systems (water, air, and land). Eligible projects include: Safeguarding Habitat, Creating Solutions for Sustainable Living, Health Planet, Health Communities, Growing the Movement. This program is issued to national, state, and local programs. No application deadline is indicated. www.turnerfoundation.org/grants.gp.asp.

New Freedom Program

The New Freedom Program is provided by the FTA and the State of Georgia and provides additional tools to overcome existing barriers facing Americans with disabilities seeking integration into the work force and full participation in society. Eligible projects include capital and operating expenses for new public transportation services and new public transportation alternatives beyond those required by the American with Disabilities Act of 1990 that are designed to assist individuals with disabilities. This program is issued for states and public bodies, private non-profit organizations, state or local governments, and operators of public transportation services including private operators of public transportation services. There is no application process for this program as the Turner Foundation has implemented an invitation-only grantmaking process. www.fta.dot.gov/grants_financing_3549.html.

Neighborhood Stabilization Program

The Neighborhood Stabilization Program is provided by HUD and is a program that stabilized communities that have suffered from foreclosures and abandonment through the purchase and redevelopment of foreclosed and abandoned homes. Eligible project include: Establishing financing mechanisms for purchase and redevelopment of foreclosed homes and residential properties, Purchasing and rehabilitating homes and residential properties abandoned or foreclosed, Establishing land banks for foreclosed homes, Demolishing blighted structures, Redeveloping demolished or vacant properties. This program is issued for states, local governments, nonprofits, and a consortium of nonprofit entities on a competitive basis. The application deadline for this program is March 1, 2011. www.hud.gov/offices/cpd/communitydevelopment/programs.

WATER AND WASTEWATER

Clean Water State Revolving Fund

The Clean Water State Revolving Fund is a Federal Loan program administered by GEFA which provides funding for a variety of wastewater infrastructure projects and non-point source projects. Eligible projects include: Constructing new wastewater treatment plants, expanding wastewater treatment plants, installing sewer lines and sewer rehabilitation projects, correcting infiltration/inflow problems and/or combines sewer overflow problems, constructing and rehabilitating municipal storm sewer systems, purchasing street and storm sewer cleaning equipment, acquisition of buffer zones and/or wetlands, and constructing storm water control structures such as detention and retention ponds and restoring streambanks. This program is issued for qualified local governments and state authorities. There is no application deadline for this program. www.gefa.org/index.aspx?page=80

Drinking Water State Revolving Fund

The Drinking Water State Revolving Fund is a Federal Loan program administered by GEFA for drinking water infrastructure projects. Eligible projects include: Implementation of security measures such as fencing, surveillance equipment, backflow prevention devices, and enhanced filtration/disinfection treatment; maintaining compliance with existing or proposed standards and regulations; rehabilitating or replacing aging infrastructure; rehabilitating or developing sources to replace contaminated sources of drinking water, including replacing contaminated private wells with public water supply; installing or upgrading treatment facilities to improve drinking water quality; installing or upgrading storage facilities to prevent microbiological contaminants from entering the system; installing or replacing transmission and distribution pipes to prevent contamination. This program is issued for qualified local governments and state authorities. There is no application deadline for this program. www.gefa.org/index.aspx?page=81

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