City of Columbia 2012

Mayors Climate Protection Agreement Progress Report
### Mayors Climate Protection Agreement Progress Report Card

Grading based on the following scale: **A=Excellent/Exceeds Expectations; B=Above Average/Meets Expectations; C=Satisfactory; D=Needs Improvement; F=Poor.**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>C</strong></td>
<td>Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan. Satisfactory. But needs some improvement due to the need for reduction targets and an action plan.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities. Above average. The goals have been met but this action item will need attention as the city grows.</td>
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<tr>
<td><strong>B</strong></td>
<td>Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit. This action item seems to be a high priority for City planners. It seems that the City has met and exceeded the needs of this action item through the GetAbout Columbia program and the Sidewalk Master Plan with improvements needed in public transit.</td>
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<tr>
<td><strong>A</strong></td>
<td>Increase the use of clean, alternative energy by, for example, investing in “green tags,” advocating for the development of renewable energy resources, recovering landfill methane for energy production and supporting the use of waste to energy technology. To date, needs have been surpassed. To keep this grade, we must make sure that 10 percent of retail sales are from renewable energy by Dec. 31, 2017.</td>
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<tr>
<td><strong>B</strong></td>
<td>Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money. Goals met but not exceeded</td>
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<tr>
<td><strong>A</strong></td>
<td>Purchase only Energy Star equipment and appliances for City use. Goals met.</td>
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<tr>
<td><strong>B</strong></td>
<td>Practice and promote sustainable building practices using the U.S. Green Building Council LEED program or similar system. Goals met for City-owned facilities however more efforts could be made with community-owned facilities.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to biodiesel. Some goals met. A City-sponsored employee education plan needs to be put in place to help educate employees about anti-idling, fuel conservation, etc.</td>
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<tr>
<td><strong>A</strong></td>
<td>Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production. Exceeds expectations</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Increase recycling rates in City operations and in the community. Meets expectations. More could possibly be done to encourage better recycling rates in the City, as our population grows.</td>
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<tr>
<td><strong>C</strong></td>
<td>Maintain healthy urban forests and promote tree planting to increase shading and to absorb CO2. Multiple City departments participate in maintaining healthy tree cover.</td>
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<tr>
<td><strong>B</strong></td>
<td>Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution. Meets expectations will work to exceed expectations with more partnerships and collaborations.</td>
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Introduction

The Kyoto Protocols were adopted in 1997 by the United Nations Framework Convention on Climate Change. The agreement creates a timeline and schedule for countries to reduce greenhouse gas emissions. On Feb. 16, 2005, Seattle Mayor Greg Nickels launched an initiative to advance the goals of the Kyoto Protocols through action by cities and communities in the United States. By the time of the U.S. Conference of Mayors Annual Meeting in June 2005, 141 mayors had signed the agreement – the same number of nations that ratified the Kyoto Protocol. As of March 2012, 1,054 mayors from the 50 states, the District of Columbia and Puerto Rico, representing a total population of 88,499,854 citizens, have signed the U.S. Mayors Climate Protection Agreement.

On July 17, 2006, the Columbia City Council passed a resolution endorsing the U.S. Mayors Climate Protection Agreement. The Council’s resolution (Section 107-468, Res. 160-06A) declares that the City will strive to meet or exceed Kyoto Protocol targets for reduction of global warming pollution and incorporates the following 12 action items for achieving that goal.

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space and create compact, walkable urban communities.

3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit.

4. Increase the use of clean, alternative energy by, for example, investing in “green tags,” advocating for the development of renewable energy resources, recovering landfill methane for energy production and supporting the use of waste to energy technology.

5. Make energy efficiency a priority through building code improvements, retrofitting City facilities with energy-efficient lighting and urging employees to conserve energy and save money.

6. Purchase only Energy Star equipment and appliances for City use.

7. Practice and promote sustainable building practices using the U.S. Green Building Council LEED program or similar system.

8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel.

9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production.

10. Increase recycling rates in City operations and in the community.

11. Maintain healthy urban forests and promote tree planting to increase shading and to absorb CO2.

12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

In 2009, the City applied for and received a Department of Energy ARRA Stimulus Block Grant, which allowed it to fund a new department, the Office of Sustainability and hire a Sustainability Manager to spearhead the City's sustainability efforts and to manage projects funded under the grant. The department is also responsible for planning, directing, coordinating a business plan, integrating short and long term sustainable comprehensive action plans, resource conservation and related sustainability programs and operations to advance a more sustainable, vital and well-planned future for Columbia. Included in the department's business plan is coordinating the City's efforts in meeting the goals of the Mayors Climate Protection Agreement.

This report provides an update and evaluation of the City's progress toward meeting the goals set out in the resolution.
1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.

Following Council’s adoption of the Mayors Climate Protection Agreement (MCPA), Water & Light Department staff collected data and created a baseline inventory of CO2 and methane emissions, the two most predominately emitted gases. CO2 and methane comprise the majority of emissions, therefore the study did not include other greenhouse gases covered under the Kyoto Protocol. Additionally, although the Kyoto Protocol calls for reductions based on 1990 emissions, the baseline was created using 2000 data for the reason that natural gas and transportation data for 1990 was not available. The inventory was completed in 2007 and will be updated in 2012.

Current Status: Complete but with scheduled five-year updates. Reduction targets and an action plan have yet to be created.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space and create compact, walkable urban communities.

In 2001, the Planning Department (now Community Development) developed a planning guide for the City’s future, titled “Columbia 2020 Metro.” This guide was designed to promote the “master planned” development idea by planning and providing amenities for neighborhoods and the community. The plan encourages the creation of neighborhood centers to provide a focal point for residents and to foster a sense of neighborhood identity. The systematic planning and provision of public amenities such as trail facilities, recreation equipment, play fields for organized sports, swimming facilities, parkways, schools, churches, day care facilities, parks and shopping opportunities at the neighborhood or community-scale is its central theme.

In summer 2006, the City of Columbia initiated a visioning process known as “Imagine Columbia’s Future.” The Final Vision and Action Plan (Vision Report) was issued in 2007 and accepted by the City Council in February 2008. One of the action items in the Vision Report suggested revising planning and zoning ordinances to align with the goals and issues identified during the visioning process. City Council approved a Vision Implementation Report committing city staff and the Planning and Zoning Commission to issue a set of recommendations for a new comprehensive plan and modernization of the City development codes by the end of fiscal year 2011.
In 2009, the Council established and appointed members to a Comprehensive Plan Task Force to study and evaluate the existing comprehensive plan, to develop a work program for producing a new comprehensive plan and to prepare a new comprehensive plan. The Task Force and Planning and Zoning Commission completed the “organizing to plan” phase of the project in March 2011. In April of that year, Council approved a contract with the University of Missouri to assist the City in developing the new plan. “Columbia Imagined” was introduced to the public in May 2011, and public forums and outreach efforts continue. Columbia Imagined is a framework for shaping and managing the future growth of Columbia, built around the following seven elements: (1) land use and growth management; (2) environmental management; (3) infrastructure; (4) mobility, connectivity and accessibility; (5) economic development; (6) intergovernmental cooperation; and (7) livable and sustainable communities. In preparation for development of the new plan, staff analyzed existing conditions. Reports and presentations of the findings were drafted to identify services and opportunities provided to citizens, businesses and institutions, and to focus the City’s future objectives for each aspect. These reports are available to the public at: http://www.gocolumbiamo.com/Planning/Comprehensive_Plan/whoweare.php

The Vision Report also suggested that the Planning Department “implement a growth management plan that incorporates form-based zoning” as a strategy for achieving its goal of developing a well-planned community. The City is currently investigating the adoption of form-based codes as a possible alternative to its current conventional zoning model. In essence, a form-based code focuses on form (building scale, arrangement, relationship to the street) as more important than land use management (code enforcement; conditions on operations) and use classification. The thought being that uses adjust to form whereas traditional zoning reverses the importance of these elements.

In May 2011, the Planning Department participated in an educational forum organized by the Downtown Columbia Leadership Council, the Central Missouri Development Council and Mid-Missouri American Institute of Architects on form-based codes.

Current Status: Ongoing.
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit.

Greenbelts, greenways and trails have been identified for many years as one of Columbia’s most valued recreation resources. As far back as 1935, City planners recognized the value of incorporating green spaces and parks into the City’s master plan.

It was during the development of the 2002 Facility Needs Update of the Parks, Recreation and Open Space Master Plan that a comprehensive trail master plan was developed. The 2002 Trails Master Plan laid out the basic route for the Columbia perimeter “loop” system. Over the next three years, park planners updated this plan as sections of the trail were developed and the geographical area of Columbia grew. The comprehensive plan was updated in 2005.

In 2006, Columbia was selected as one of four communities in the nation to participate in the Federal Highway Administration’s Non-Motorized Transportation Pilot program. Columbia’s designation as a pilot city came with $22 million in federal funds over a four-year period to help build infrastructure and establish national standards for public awareness and willingness to use active modes of transportation. Through additions and improvements to our network of walking and biking opportunities, GetAbout Columbia is
Increasing the choices for safe and fun travel around town. More than 125 miles of new bikeways, pedways and sidewalks have been created or are in development through the grant. A complete list of the capital improvements funded through this grant can be found at: http://www.gocolumbiamo.com/PublicWorks/GetAboutColumbia/Infrastructure_Updates/index.php.

In FY2012 and 2013, a second round of funding to the GetAbout Columbia program, totaling roughly $5 million, will be prioritized and programmed to carry out additional improvements to the non-motorized transportation network.

Further endorsement of planned development for Columbia’s trail system came from the Visioning Committee, who included as a goal in the Vision Report “An extensive, safe network of trails [which] will accommodate a variety of users ranging from recreational to nonmotorized travelers. This network may include roadway and public transportation infrastructure to connect parks, neighborhoods, schools and businesses.”

In 2009, City Council directed Parks & Recreation Department staff to prepare an update to the trails plan to incorporate decisions made in establishing GetAbout project priorities and to recommend changes and additions based on growth and development of the community. The 2010 Trails Plan was approved by City Council April 5, 2010. The ultimate goal of the updated plan is to create a trail system of interconnectivity between residential subdivisions, employment centers, schools, parks, businesses and downtown. A current list of capital projects related to the trail system is located at: http://www.gocolumbiamo.com/ParksandRec/Trails/#cip.

Public support for trails and parks in Columbia remains strong. In 2000, Columbia citizens voted to impose a sales tax of one-fourth of one percent for five years and one-eighth of one percent thereafter, dedicated to providing funding for local parks, trails and natural lands for water quality, wildlife, tree preservation and recreation purposes. The portion of the tax set to expire was extended by voters in 2005 and again in 2010. Revenue from this tax has generated significant funding for purchase, development and maintenance of parks, trails and green space. Complete information about the history of the sales tax and projects it has funded can be found at: http://www.gocolumbiamo.com/ParksandRec/park_sales_tax.php#one.

Columbia also contributed to the creation of the Eagle Bluffs Conservation Area, located adjacent to two popular hiking and biking trails, the City’s MKT trail and Katy Trail State Park. Four wetland treatment ponds were developed in 1994 at the wastewater treatment plant. Not only did construction of the wetlands allow mechanical expansion of the plant to be deferred for 15 years, it also provides treated effluent used to maintain wetlands at Eagle Bluffs Conservation Area. The Missouri Conservation Department prefers using Columbia’s treated effluent as opposed to Missouri River water, which must be pumped to the park at considerable expense. This state park is used for hiking, hunting, fishing, bird watching and other public recreation.

The City maintains a sidewalk master plan to identify critical routes needed to enhance the current sidewalk system based upon a matrix of identified needs and priorities. With the newly created sidewalk digital inventory/GIS layer, the master plan (last updated and adopted in 2007) will be updated in 2012 to include additional sidewalk needs, such as existing sidewalks in poor condition and priority intersections needing pedestrian improvements.

Current Status: Ongoing. The City will continue to prioritize program trails projects using GetAbout Columbia funding and allocate the latest parks sales tax for local parks, trails and natural land preservation and enhancement. The sidewalk master plan will be updated in 2012 with the oversight of the Bicycle and Pedestrian Commission, and using the newly developed sidewalk GIS layer, staff plans to create a more robust product to identify and improve upon the sidewalk system.
4. Increase the use of clean, alternative energy by, for example, investing in ‘green tags,’ advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology.

In November 2004, Columbia voters approved a renewable energy ordinance for the City’s power supply portfolio. The ordinance requires Columbia Water & Light to generate or purchase increasing levels of energy from eligible renewable energy sources at the following levels:

- Two percent of electric retail sales (kWhs) by Dec. 31, 2007;
- Five percent of electric retail sales (kWhs) by Dec. 31, 2012;
- Ten percent of electric retail sales (kWhs) by Dec. 31, 2017; and
- Fifteen percent of electric retail sales (kWhs) by Dec. 31, 2022.

In 2011, the City of Columbia received 5.4 percent of the electric supply from renewable resources, which surpasses the current requirement and meets the goal for 2013.
Columbia Water & Light immediately began to pursue renewable energy sources following the voter mandate. In 2005, the City began receiving its first renewable energy through a short-term contract for landfill gas energy from Illinois. In 2007, Columbia started receiving power generated from wind turbines at the Bluegrass Ridge Wind Farm in northwest Missouri. Energy from this source provided 1.3 percent of Columbia’s energy needs in 2011.

The Columbia Landfill Gas Energy Plant was constructed with funds allocated through a 2006 bond issue. Electricity is generated by using gas created from decomposing waste at the landfill. The landfill can currently generate 2.1 megawatts of renewable power. In 2011, the landfill gas plant produced 13,684 megawatt hours of energy which was 1.2 percent of Columbia’s energy portfolio. There are plans to add another one megawatt generating unit at the landfill in 2012 because the amount of gas being generated has gone up with the addition of a bioreactor at the landfill. After this unit is added, there is still room for a fourth generator. With four generators, electric production could grow to approximately 2.5 percent of Columbia’s energy portfolio over the next 10 years.

Columbia Water & Light started a pilot project in April 2008 to burn waste wood along with coal at the local power plant. The wood chips are purchased from a barrel production plant in Lebanon, Missouri. The wood is a byproduct of creating curved planks so it is considered a carbon neutral energy source. Using this form of biomass allows the utility company to lower emissions and rate the effectiveness of a biomass fuel source. In 2011, the Columbia Power Plant produced 7.8 percent of the City’s electric portfolio. Of the electricity produced, the City used a 10 percent mixture of waste wood along with the coal. The energy produced by waste wood was 11,818 megawatt hours, which is 1 percent of Columbia’s electric portfolio. Moving to a higher percentage of waste wood, however, would require changes to the existing coal handling equipment, and is therefore not an option at this time for using waste wood to increase the plant’s renewable energy output. The fuel cost for waste wood is lower than coal and operating costs are comparable, so using a 10 percent wood mixture is a cost effective option for the utility at this time.

Columbia Water & Light entered into a 20-year power purchase agreement with Ameresco for 3.2 megawatts of energy generated by the Jefferson City landfill gas plant. Columbia first received energy from the plant in April 2009. The total amount purchased in 2011 was 22,848 megawatt hours, or 1.9 percent of the electric portfolio.

In planning for the future requirements of the renewable energy ordinance, Columbia Water & Light wanted to develop a solar energy program. Solar One was launched in November 2008 as a way for customers to affordably invest in local solar energy projects. Energy is generated through solar systems located on City-owned property or
Columbia businesses. By working with the business community, Water & Light is able to provide more solar energy at a lower cost, as commercial buildings often have large roof tops with good solar exposure. Businesses may also take advantage of incentives for installing solar panels that are not available to the utility. As this solar project develops, its future will be evaluated by the Water & Light Advisory Board and the City Council. In addition to the Solar One project, rebates and net metering are available for residential customers installing solar systems. This program allows customers to sell energy they do not use back to the utility at the residential electric rate.

In December 2010, the Columbia City Council signed a solar energy lease agreement with Free Power Company. Free Power will supply, install, and maintain photovoltaic system equipment, and the City will be responsible for site selection, site preparation and electric service to the interconnection point. Staff is currently working with Free Power Company to select appropriate City sites for installation of the photovoltaic systems. The first project at a City-owned warehouse site is expected to be the largest solar rooftop installation in the eight contiguous states. The goal of the agreement with Free Power is to install solar systems that will generate 12,000 megawatt hours a year or 1 percent of Columbia’s electric supply.

The Columbia City Council approved a contract with NextEra Energy Resources Feb. 6, 2012, for wind energy. The wind energy will be generated for Columbia from the Crystal Lake III Wind Energy Center located in Hancock County, Iowa. The 21 megawatt wind energy contract will produce around 60,000 kilowatt hours in one year. This long-term contract for wind energy allows the University of Missouri to purchase half of the wind power from the City through short-term agreements.

The Green Tag system allows a utility to make purchases of Green Tags and thus participate in the development of green, or renewable, energy without actually receiving that energy in the utility’s system. Columbia Water & Light does not currently purchase Green Tags and intends to comply with the renewable energy ordinance by finding sources located close enough to Columbia that power can be physically transmitted into our system. In the future, however, the increased compliance requirements may force it to look at Green Tags as an option.

Current Status: With an estimated 7 percent of Columbia’s electric portfolio coming from renewable resources in 2012, the 2013 renewable energy ordinance mandate of 5 percent will be surpassed.
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money.

External Efforts

In March of 2011, the City adopted the 2009 International Building Code with amendments. The City created commissions to advise the City Council on energy code issues. The Building Construction Codes Commission (BCCC) reviewed the codes and provided a construction industry perspective. The Environmental and Energy Commission (EEC) added input on the benefits of energy codes, stimulated public interest and engaged public/private agencies. Of particular note, the City adopted Chapter 11 of the 2009 International Residential Code regarding energy efficiency essentially verbatim with very minor amendments.

The City of Columbia Office of Sustainability and Columbia Water & Light received a grant through the Environmental Protection Administration, Climate Showcase Communities program. The City’s grant award, titled “City Green: The District” will work cooperatively with downtown businesses and building owners to reduce energy usage downtown. The overall goal of this project is to strengthen the economic viability of
downtown businesses by implementing energy efficiency measures that will reduce costs. City Green includes energy benchmarking, assessments of buildings, and implementation of energy efficiency measures. More than 100 downtown businesses and organizations have signed up to participate in this program. A list of participants is located at: http://www.gocolumbiamo.com/WaterandLight/Documents/Partcipants.pdf.

Columbia Water & Light offers free energy audit and evaluation for customers to provide energy and water efficiency tips specific for their particular location. The program ensures that customers receive an unbiased review of habits, equipment and structure issues in order to make informed decisions regarding which conservation efforts will reap the highest returns. The program is the first line of defense to saving resources and money. Many of the tips recommended by the audit professionals are easy, low cost, do-it-yourself projects. The department also provides extensive information about energy and water conservation on its website.

Home Performance with Energy Star is a national program for existing homes designed to help homeowners bring their homes up to Energy Star standards for comfort, safety, health, durability and energy efficiency and is offered by Columbia Water & Light. The program is available to qualified Columbia Water & Light residential electric customers who are remodeling their homes to be more energy efficient. Home Performance program parameters must be followed to qualify for rebates or a Home Performance loan, which is a low-interest loan program to assist electric customers with financing energy efficiency improvements. Rebates are offered for numerous energy efficiency improvement projects, including upgrading insulation, air sealing, HVAC and windows and doors. In addition to offering incentives to customers to retrofit existing homes for greater efficiency, new homes that have been certified as Energy Star rated may qualify for a rebate through the New Home Energy Star Rebate program.

Internal Efforts

In 2010, an internal work group, Columbia/City Operators Reducing Energy (CORE) was created by the city manager. The work group is chaired by the sustainability manager and consists of city staff that coordinate energy reduction and conservation efforts throughout all departments. CORE works to assess the needs, priorities and opportunities for implementing practical programs, policies and initiatives to lessen to the greatest extent possible the impacts on the environment caused by City operations.

CORE’s first main task was to facilitate the City’s
activities financed through the Energy Efficiency and Conservation Block Grant. It provided guidance in selecting a consultant to perform energy assessments of City-owned facilities and prioritizing projects identified through the assessment. Improvements suggested in the assessment included replacing lighting with more efficient fixtures, re-commissioning HVAC systems and improving HVAC controls for optimum efficiency.

In 2011, HVAC system and lighting improvements were made at the Health Department. Following completion of the HVAC project in June 2011, power use has significantly been reduced. Electricity savings are slightly in excess of 25 percent, and natural gas reductions have exceeded expectations. Through these greater-than-expected energy savings, the project costs will likely be recaptured sooner than the initial projection of 2½ years. The lighting retrofit project is expected to reduce electricity use 15 percent further than the reductions already realized by HVAC upgrades.

The gas heating system at the Grissum Building was upgraded in November 2011 with a new control system, which is now set up to run more efficiently and also allows authorized staff to control thermostats from a central, password-protected location. Energy and cost savings are projected at 17 percent, approximately $7,900 per year. Managers from other departments attended a demonstration and are considering adding thermostat controls where appropriate. The Grissum Building will also benefit from lighting retrofits completed in December 2011, which are expected to save an additional 12 percent in energy use. In addition, two overhead doors at the Grissum facility in the fleet maintenance area are being updated with translucent doors to allow additional light into the facility.

Lighting retrofits were made at the Parks and Recreation administrative building and the Armory. Parks staff completed the work, realizing savings on top of an expected 10 percent decrease in energy costs. In August 2011, lighting was upgraded in the landfill buildings, with an expected reduction of 18 percent in energy.

A number of projects are currently in progress. Lighting improvements are underway at the water treatment plant, Water & Light buildings and two downtown parking garages. Additionally, retrofitting of the HVAC system at the Heuchan Building is ongoing.

CORE is also working to reduce the City’s use of desktop printers and paper. To jumpstart this initiative, a pilot project was created for the second floor of the City Hall addition, which houses five departments: the City Manager’s Office, the City Clerk’s Office, the Law Department, Geospatial Information Services and the Office of Sustainability. Paper use and printing by these departments will be tracked through installation of an audit program onto each department’s printer. The printers will also be reprogrammed to default to double-sided printing. Paper use will be tracked through the auditing period and compared with historical data to determine the extent of savings, both in terms of cost and reduction in paper used. This information will be used to set realistic goals for the development of a paper-use policy that will be implemented by all City departments. It will also be used to encourage employees to voluntarily modify work habits to decrease printing and storing paper files and to electronically store documents where appropriate. Although the City already purchases paper with 30 percent post-consumer recycled content, the group will also study whether purchasing guidelines should be adjusted to options that impact the environment to an even lesser degree.

CORE encourages employees to conserve energy by turning off or placing into energy-saving mode all personal work stations, copiers, network and desktop printers, fax machines and task lighting when not in use. As a reminder, informational posters have been placed conspicuously in break rooms and other areas where office equipment is used.

While many departments have already taken steps to more efficiently use resources, the CORE group sees a need for the City to develop a long-term, coordinated sustainability strategy, and is drafting a formal plan to submit to the manager and City Council for approval.

Current Status: Goals met.
6. Purchase only Energy Star equipment and appliances for City use.

The City adopted an ordinance in 1992 giving preference to recycled and environmentally preferable products. While this ordinance does not explicitly require purchase of Energy Star equipment and appliances for City use, this is the City's practice.

Current Status: Goals met. For example, in the past 18 months 10 new Energy Star appliances (stoves, dishwashers, laundry equipment, etc.) were purchased to replace failed appliances at fire stations.
7. Practice and promote sustainable building practices using the U.S. Green Building Council’s LEED program or similar system.

Leadership in Energy and Environmental Design (LEED) is a green building certification program created by the US Green Building Council. LEED is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. New construction certifications are evaluated in six categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovation in Design. The City of Columbia is committed to pursuing LEED certification status for new construction and renovation projects.

The historic Wabash Station, originally built and opened in July 1910, is the main hub of Columbia Transit. The station underwent extensive renovations in 2007, which included the addition of a new administrative annex, expanded waiting area in the historic depot, a covered walkway extended out the back and two pieces of artwork created by local artists. The project was the first in the city to achieve LEED certification.

Columbia Fire Station #9, built in 2009, was the second city facility to be awarded LEED status, achieving a Gold certification in 2010. LEED elements used in the design of the station included the use of Forest Stewardship Council certified lumber, recycling of construction waste, use of low-VOC (volatile organic
compounds) sealants and paints, recycled content for flooring and siding and collecting and cleaning storm water runoff through an on-site rain garden and bio-swale.

Later in 2010, Fire Station #7 was awarded LEED Silver certification, becoming the third City-owned building to achieve LEED status. The design of the station included the use of building materials with recycled content, ground-source heat pumps for heating and air conditioning, use of porous asphalt for stormwater collection and installation of rain garden and bio-retention basin for cleaning storm water runoff. Other green features include low-VOC paints and coatings and clerestory windows for improved day lighting. Additionally, construction waste was recycled throughout the project.

In planning for the renovation and expansion of the Daniel Boone Building, one of the primary goals for the project was to attain LEED Silver certification. Once the project entered the building phase in 2008, the architect, builders and City staff realized the possibility of “going for the Gold.” On June 30, 2011, the City was notified that the City Government Center surpassed its initial goal and that the project had achieved LEED Gold certification. Elements of the project that helped accomplish certification include building materials containing recycled content or rapidly renewable resources; use of no- or low-VOC products; and state-of-the art ventilation. This interactive map illustrates some of the eco-friendly highlights throughout the building: http://www.gocolumbiamo.com/Sustainability/LEED/demopage.php.

In addition to a commitment to constructing green buildings, the City is also committed to green maintenance of its facilities. Cleaning equipment and products are evaluated to ensure they meet sustainability criteria. Cleaning products must meet the Green Seal GS-37 standard or comply with maximum allowable VOC levels. Staff receives ongoing training opportunities on products and equipment.

**Current Status: Goals met for City-owned facilities.**
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to biodiesel.

The City of Columbia has been using biodiesel fuel since May 2002. More than 300 City vehicles run on biodiesel, including buses operated by Columbia Transit and Solid Waste collection vehicles. The fuel site at the Grissum Building provides approximately 500,000 gallons of biodiesel fuel a year in support of municipal operations. The City uses a blend of biodiesel. Soy oil is blended with petroleum diesel at rates of two percent up to 20 percent soy oil and the remainder is standard diesel fuel. Using this biodiesel blend has several advantages over standard diesel fuel, as it offers significant clean air benefits; is a renewable source; reduces our dependence on oil imports; increases the demand for soybeans grown in Missouri; and requires no special equipment modifications to use. The blended fuel reduces equipment maintenance costs by contributing to the lubrication characteristics of the fuel.

City cars are fueled with an ethanol blend. The City purchased its first hybrid vehicle in 2004, and departments are integrating hybrid vehicles into the fleet when they can be effectively used. The City has currently incorporated 14 hybrid vehicles into its fleet. These cars are used by numerous departments,
including Water & Light, Community Development, Parking, Sewer Engineering, and Transit.

The Public Works Department was the first City department to adopt a formal fuel conservation policy, doing so in 2008. The policy prohibits employees from idling to either warm or provide air conditioning; encourages sensible driving habits; requires that the speed limit be observed; requires the removal of excess equipment to lighten load and increase fuel mileage; requires maintenance of proper tire pressure; and requires planning and combining trips whenever possible. In addition to these efforts, Public Works staff uses a City bicycle for field checking design and construction projects. Using the bicycle for short trips saves time. Employees also use the bicycle for construction inspection of trail and sidewalk projects. This allows inspectors to cover more project area in less time when compared to walking the trail corridor.

Columbia Water & Light formally adopted a fuel conservation policy similar to the Public Works policy in 2011. A City-wide policy is under development.

Current Status: A Citywide policy is under development and expected to be adopted by Summer 2012.
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production.

Water Supply

Columbia Water & Light supplies domestic, commercial and industrial water customers within the City limits and two former rural water districts adjacent to the City. Columbia’s water is pumped from wells that tap into a water-filled bed of sand and gravel beneath the bottom land bordering the Missouri River just southwest of the city. Melting glaciers washed sand, gravel and boulders downstream and left thick deposits along the course of the river. This geological formation is an alluvium and when saturated with water becomes an alluvial aquifer. Water slowly moves through the aquifer, which acts as a natural filtration system. Forty-four billion gallons of water fill the area which is constantly replenished by groundwater sources. The wells average 110 feet deep, penetrating the aquifer near its bottom. Following processes to soften and filter the water, it is pumped from the water treatment plant to reservoirs at the West Ash, South Pump and Hillsdale pumping stations. The water is then pumped throughout the city to consumers. Water is stored in three water towers that provide capacity for peak flows and fire fighting.
There have been two water studies to determine future requirements at the water treatment plant. In 2008, Columbia Water & Light contracted with Jacobs Engineering Group Inc. to develop a long range water system study for future water supply and distribution needs within the utility’s service area. The objective of the study is to identify needed capital improvements for Columbia Water & Light’s continued proactive response to provide water service to the customers within its service area for a 20-year planning period (2008 to 2028). Along with this research, another engineering firm is looking at what expansion measures and additions to the treatment process might be needed to meet demand and future regulations. The water treatment plant study will be sent to the City Council in 2012.

**Wastewater Treatment**

In 2008, voters approved a sewer bond issue for improvements to the City’s waste water treatment plant and collection system. The improvement project, which began in February 2010, is slated for completion in 2012. The 2010 Improvement Project involves constructing an additional 12.4 million gallons per day of mechanical treatment capacity, constructing a grit removal facility, rehabilitating the existing mechanical treatment system and effluent pump station, constructing a new administration facility, constructing a bio-solids dewatering facility and installing odor control system at various locations around the site. The design of this project incorporated a more efficient treatment process and high efficiency pumps and motors on all new equipment provided with the project as described in the following sections.

**Aeration Basins No. 1 and 2 – Aeration System**

The existing two aeration basins each utilize four, 60 Hp static surface aerators to aerate the treated wastewater in a Complete Mix Activated Sludge (CMAS) treatment configuration. These surface aerators consume 3,300,000 kilowatt hours (kWh) of electricity each year.

As part of the aeration basin improvements, the existing Aeration Basins No. 1 and 2 will be converted from a CMAS treatment configuration to a plug flow configuration with tapered aeration. The new system allows greater control of the aeration process and further reduces the energy required for treatment of the wastewater.

Columbia will realize a reduced power consumption of 57 percent compared to the existing surface aerators.

**Aeration Blower System – High Efficiency Aeration Blower Equipment and Fine Bubble Aeration Diffusers**

Process air for the new and modified aeration basins will be provided by aeration blowers. The most common type of aeration blowers that supply air in the volumes and flow rates necessary for the Columbia Regional WWTP are multistage centrifugal blowers utilizing inlet valve throttling. A different technology that operates at improved efficiencies over a multistage blower is a single-stage blower.
The use of high efficiency single-stage blowers will offer a 26 percent reduction in annual energy consumption over traditional multistage blowers.

**Final Sludge Pumping Station No. 1 – Return Activated Sludge (RAS) Pumping System**

Return activated sludge (RAS) is currently returned to the aeration basins to support the activated sludge process. As part of the Columbia Regional WWTP – Phase 1 Improvements project, four air lift pumps and blowers will be replaced with pumps. The overall system efficiency will be improved and the power consumption for RAS pumping will be reduced.

The existing air lift blowers consume 1,100,000 kilowatt hours (kWh) each year. The new AFD driven pumps will consume 700,000 kilowatt hours (kWh) each year under average conditions. This represents a reduced power consumption of 36 percent compared to the existing air lift blowers.

**Digestor Complex – Methane Gas Utilization**

The Waste Water Treatment Plant (WWTP) generates low-grade methane gas through the anaerobic digestion of biosolids produced during the treatment process. The sewer utility uses this methane gas to heat buildings, provide process heating and produce electricity to reduce costs and conserve energy. The WWTP currently utilizes a 240 kW methane powered engine generator which produces approximately 990,000 kW of electricity valued at over $79,000 and uses over 50 percent of the methane gas each year. An additional six million cubic feet of methane gas is used to heat buildings and to keep the digester at operating temperature. This generator was installed with the plant construction in 1983. As part of the 2010 improvement project, the existing 240 kW engine generator is being replaced with two 375 kW engine generators. The two new units are anticipated to produce approximately 5,000,000 kW annually at a value of $300,000.

**Current Status: Ongoing.**
10. Increase recycling rates in City operations and in the community.

Community Recycling Efforts

The City of Columbia first began its curbside recycling program in 1985. Curbside recycling was initially just that – residents left sorted recyclable materials at the curb. In 1998, Public Works began distributing two sets of bags, blue for commingled recyclables and black for trash, to all residential customers. In order to reduce the number of unused bags and to reduce costs, the department subsequently began issuing vouchers for the bags. The vouchers can be redeemed to receive recycling and trash bags free of charge at numerous locations throughout town. Currently, materials that can be recycled in the blue curbside bags include glass bottles and jars, aluminum cans, metal food cans, and #1 and #2 plastic containers. The City ships glass bottles to St. Louis, where a local facility recycles the glass into new bottles. Additionally, residents may recycle corrugated cardboard, boxboard, chipboard, office paper, newspapers, magazines, catalogs, phone books and other paper materials curbside by bundling or placing the items in a cardboard box or paper sack.

Curbside recycling has been slowly increasing since the program began. 4,497 tons were recycled in 2006, and 4,687 tons were recycled in 2011. The City’s Material Recovery Facility (MRF) processed 10,388 tons of
material last fiscal year and received $1,256,243 in revenues for processed recyclables.

In March 2010, the Public Works Department conducted a one-year pilot program to determine if residents would recycle more using reusable bins rather than with blue bags. The department undertook this project due to stagnation in the residential recycling program despite Columbia’s population growth of recent years. Under the pilot program, residents in the pilot area were provided two 18-gallon bins rather than the customary blue bags. The participants received a blue bin for recyclable beverage and food containers and a green bin for paper products. The bins were purchased with grant funding from the Mid-Missouri Solid Waste Management District and the Missouri Department of Natural Resources. The pilot area consisted of two Friday recycling routes north of Interstate 70. The two adjacent routes involved approximately 1,800 homes, and each contained areas of high and low recycling participation. There was no change to the material accepted for recycling. The pilot project was complete in February 2011. Letters and surveys were mailed to each of the homes in the pilot area. Residents were asked to complete a survey and return by April 30, 2011. The pilot project was considered successful, with the collection of 525,360 pounds, a 47.2 percent increase from previous years. The survey results also indicated that residents overwhelmingly preferred using bins as opposed to blue bags. Despite the success of the pilot project, Public Works has decided that it is not the appropriate time to replace the bags with bins, as the City is currently evaluating the use of roll carts and automated trucks for residential trash service. It is believed that if roll cart trash collection is adopted, residents will increase their level of recycling as a way to decrease the volume of materials placed in the roll cart.

In addition to its curbside program, the City provides ample opportunities for residents who prefer not to leave their recyclables at the curb. Public Works maintains 11 drop-off recycling centers located throughout the city. There are separate bins for each of the same materials that may be recycled curbside. Additionally, a number of these large recycling bins are rotated among apartment complexes located throughout town. In 2007, the department began placing blue beverage container recycling bins near the gas pumps and entrances of convenience stores. Residents may also bring clean loads of corrugated cardboard, newspaper, office paper and aluminum containers to the Materials Recovery Facility (MRF) at no charge during normal working hours. The facility also accepts loads of commingled materials for a fee. Major appliances such as washers, ranges, dryers, freezers, dehumidifiers, stoves, dishwashers, refrigerators, water heaters, air conditioners, trash compactors and conventional ovens are also accepted at the MRF for a fee. There is a $10 charge for non-refrigerated and $15 charge for refrigerated units.

Through a Mid Missouri District Grant, the City also provides recycling bins to the Daniel Boone Building to collect recyclables. To reduce the number of potential toxins entering the sewer and storm sewer systems, the Public Works Department offers household hazardous waste disposal for items such as pesticides, cleaning products, batteries and paint. This program, started in 1992, collects more than 125,000 pounds annually. Items collected through this program are sorted and those that are reusable are made available to residents free of charge at the “Swap Shed.” On its website, the City also provides information about recycling and reuse of the numerous materials that cannot be recycled at the MRF and should not be placed in the landfill. This information is located at: http://www.gocolumbiamo.com/PublicWorks/Solidwaste/recycling.php.
The City also offers recycling services for commercial and business customers. Public Works provides roll carts or dumpsters for a fee based on the volume of recyclable materials. Recyclables are collected and delivered to the MRF for processing.

In April 2009, due to the new bioreactor landfill capability, the City began accepting yard waste for curbside recycling pickup. Liquids are added to the waste at the landfill to accelerate decomposition, waste stabilization and gas production. The landfill’s current disposal cell, Cell 4, opened in January 2008 and was subsequently permitted in April 2009 to operate as a bioreactor. The bioreactor has opened the second of three proposed bioreactor landfill disposal cells. A new bioreactor cell is currently in design.

Public works also recovers waste heat from the electrical generators utilizing landfill gas. This waste heat heats the buildings at the landfill and material recovery facility.

Public Works maintains two yard waste drop-off sites for residential yard waste. Clean drywall is also accepted for a fee. These materials are turned into mulch, which is available in bulk and free of charge to residents. Also contributing to the City's mulch program is Kraft Foods, which generates 32 tons of wiener casing waste each week. The wiener casings are now used to make compost rather than going to the landfill.

In early 2011, the City obtained approval from the Missouri Department of Natural Resources to compost food waste. Food waste composting operations began in the fall of 2011.

**Internal Efforts**

City staff routinely recycles numerous items, including paper, cardboard, plastic, aluminum, and printer ink cartridges.

The Public Works’ Fleet Maintenance Division recycles used motor oil. All used motor oil is collected and used for heating approximately 30,000 square feet of the City’s Operations Center. Used motor oil not utilized for heating the building is collected and sold to oil recycling companies for processing back into motor oil. Additionally, all used metal parts from vehicle maintenance operations, including filters, are recycled as scrap metal.

**Current Status: Ongoing.**
11. Maintain healthy urban forests and promote tree planting to increase shading and to absorb CO2.

In 2006, the City Council approved the Natural Resources Inventory project, which is a compilation of information regarding the community’s natural resources. The area covered by the project, which was completed in 2010, includes the approximately 198 square miles in and around Columbia. Approximately 43 percent of the area included by the project was found to be covered with tree canopy.

For any construction project involving land disturbance, City ordinances require the preservation of at least 25 percent of any climax forest area on tracts of land greater than one acre. The term “climax forest” is defined as any contiguous woodland area of at least 20,000 square feet which is dominated by climax species such as oak, hickory, sugar maple or other bottomland hardwoods. Additionally, City ordinances also impose screening and landscaping requirements on certain types of new development. The landscaping ordinance requires that plant materials comprise at least 15 percent of the total land area, and mandates the planting of shade trees in parking lots. Street trees are also regularly installed as part of new roads constructed by the City.

The Public Works Department, in cooperation with the Hinkson Creek Watershed Restoration Project, integrated phytoremediation technology at the City's landfill. Phytoremediation is the treatment of environmental problems through the use of plants and trees that are able to contain or eliminate metals,
pesticides, solvents, explosives, crude oil and its derivatives, and various other contaminants from the soil. It’s a clean, efficient, inexpensive and non-environmentally disruptive, as opposed to processes that require excavation of soil. Although no such contamination was present, the City decided to take a proactive approach. The project was developed in 2007 as part of a grant funded by the Missouri Department of Natural Resources and Environmental Protection Agency Region 7. The cost-share program consists of approximately seven acres on which the City planted 1,950 cottonwood and sycamore trees provided by the Missouri Department of Conservation.

Maintaining the thousands of trees located in the City’s parks and trails is an integral part of the Parks & Recreation Department’s mission of “improving our community’s health, stability, beauty, and quality of life by providing outstanding parks, trails, recreational facilities and leisure opportunities for all Columbia citizens.” In 2010, the department received a grant from the Missouri Department of Conservation to inventory and assess the value of a thousand trees at Stephens Lake Park. As part of the project, 14 trees near the perimeter trail in the park were selected to display a price tag showing each tree’s estimated annual monetary benefit.

Columbia Water & Light promotes tree planting through its “Tree Power” program, which promotes energy conservation through energy-efficient landscaping. Residents who sign up for the program meet with Water & Light staff on their property to receive suggestions for the best places to plant shade trees. The customer then receives a packet with a planting diagram and coupon for a free six to 10-foot shade tree. Water & Light sometimes finds it necessary to remove trees that are growing into power lines. Customers who have trees removed for this reason are eligible to receive an ornamental replacement tree free of charge. In recognition of its efforts to promote responsible tree planting and maintenance, Columbia Water & Light has for nine consecutive years received the Tree Line USA award from the National Arbor Day Foundation. The award honors utilities for responsible tree trimming practices and programs to promote appropriate planting near utility lines.

Current Status: Ongoing.
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

Multiple City departments work with Columbia Public Schools, professional associations, and other groups on ways to conserve our natural resources. As long standing Partners In Education with Columbia Public Schools, the City of Columbia has received awards for our outreach efforts. Columbia Water & Light has the Energy Challenge program with ninth grade classes. Employees spend time in the classrooms, providing an entertaining, yet informative, look at the science of energy. Students are assigned a questionnaire about their family’s energy use. They then enter the information in a computer program and receive recommendations on how their family can reduce their energy consumption and save resources for the future.

The City Channel is the government access station for Columbia and provides citizens with information about government activities and services. “Conservation Tips” is the channel’s longest running and most popular show and has been educating the public on saving money through energy conservation since 2000. The City Channel airs on local cable stations and many programs are also broadcast online. The videos are also available on YouTube and had almost 290,000 views.

GetAbout Columbia provides education to motorists, cyclists, and pedestrians regarding nonmotorized transportation and related safety issues.
The Public Works Department provides numerous educational opportunities on the issue of sustainability and energy conservation. It electronically publishes a semi-annual newsletter titled “Wastelines,” which provides information about recycling programs and volunteer opportunities. The department also hosts composting workshops each fall and spring at the Capen Park Demonstration Site located off Rock Quarry Road. Attendees learn about composting and receive a free or reduced-price bin at the workshop. Additionally, Public Works employs a stormwater educator, who leads outreach to the community on stormwater issues, including presentations and events. In 2011, the City partnered with Boone County and the University of Missouri to present a webinar series titled “Watershed & Stormwater Management.” This five-part series was hosted at City Hall, with topics that included stream restoration, rainwater harvesting, design and retrofitting of stormwater infrastructure for urban communities and reducing pollution through design and maintenance of wetlands.

Columbia Water & Light is dedicated to showing young people ways to conserve our resources and make our city a better place in which to live. Each year, Columbia Water & Light spends time in the Columbia Public Schools’ eighth-grade science classrooms, providing an entertaining, yet informative, look at the science of energy. Each year, staff also works with Columbia’s junior high art departments to produce a conservation calendar, providing an opportunity to encourage saving resources and electrical safety. This program is also a great platform to display artwork and talent of Columbia’s fine young artists. The calendar is sent each year to all of customers. Another opportunity for local students with a special interest in science is an annual learning experience called “Saturday Science.” Columbia Water & Light hosts this event with the Columbia Public Schools. Students are taught science theories involved with energy production and water treatment, which includes tours of facilities and hands-on learning projects.

**Current Status:** City departments work to educate the public about sustainability efforts. For instance, Water & Light spends time educating junior high school students about energy and conservation. Ongoing.