

INTRODUCTION

BACKGROUND

On August 9, 2005, Mayor Haralson signed the US Mayors' Climate Protection Agreement. Since then the City of Norman joined over 418 other communities across the country in pledging to reduce global warming emissions. Mayor Haralson charged the Environmental Control Advisory Board (ECAB) with the task of reviewing the agreement and proposing a general plan of action to be implemented by the City of Norman. ECAB undertook the task and researched each of the 12 elements or recommended action items listed in the Climate Protection Agreement. Based on this review, ECAB has produced a document to serve as a reference tool for both the mayor and the city council to implement a climate protection plan.

CLIMATE CHANGE

As has become evident recently, global climate change is a prominent issue that cannot be ignored any longer. Recent research and data have resulted in agreement among the scientific community that global climate change is a real threat with potentially disastrous consequences to the human and natural environment. Climate change refers to an alteration of weather patterns and climates related to anthropogenic emissions. Release of carbon dioxide, methane, and other gaseous compounds fuels the increase in temperature, which in turn affects the current cycles and conditions of the globe. Changes of this scale and magnitude could result in a dynamic chain of events with potentially dire consequences.

MAYORS' AGREEMENT

At the time the US Mayors' Climate Protection Agreement initiative was started, a consensus by the scientific community on the validity and causes of climate change had not been reached. Consequently, a few nations opted not to ratify the United Nations treaty (i.e., Kyoto Protocol) that included mandatory reductions in greenhouse gas emissions. The United States (US) was one of those nations that chose not to ratify the agreement. Since the US did not assume the lead role, communities led by Seattle Mayor Nickels decided to address the issue independently of US national policy. This agreement includes a voluntary 7% reduction in greenhouse gas emissions based on 1990 levels and requests mayors and communities around the country develop an action plan that addresses 12 fundamental issues or items. Most of the communities that have joined the program have more than doubled the target goal to 15% to be reached within 12-15 years.

Local governments have direct influence over activities that significantly contribute to climate emissions—waste, transportation, consumption, urban growth, and energy. Consequently, meaningful change can be realized at the community level without waiting for federal support or approval. More important to the local community is that this agreement will provide tangential benefits besides reducing greenhouse gas emissions. In 2005, 160 communities implemented specific actions that prevented 23 million tons of emissions, but also realized a \$600 million saving in energy and fuel by implementing the agreement. This manifests itself in terms of direct and indirect taxpayer savings, improved health and environmental conditions, jobs and business benefits, and enhanced community livability.

Undertaking an endeavor such as this may appear to be overwhelming and potentially restrictive at first glance. However, there are tools and resources available to assist local governments with implementing the agreement. Software, case studies, and guidebooks have been developed and are readily available for immediate use and are relevant to the City of Norman. More importantly, there is a 5-step program already designed to help fledgling communities succeed. ECAB has reviewed various aspects of the agreement and feels that this is an achievable venture with limitless possibilities. Norman is the only city in the State of Oklahoma whose mayor has signed this agreement. By enacting it Norman can maintain its leadership in Oklahoma as a forward-thinking and progressive community.

CLIMATE PROTECTION PROGRAM

The Climate Protection Program's five milestones provide a simple, standardized means to enable the City of Norman to effectively reduce the emissions from both government operations and the community as a whole. Engaging in the five-step process means that Norman is making a commitment to reduce global warming emissions as financial and staff resources allow. The process of completing the five milestones is not necessarily linear. The milestones can be undertaken concurrently, and the specific target and contents of the local Climate Action Plan are up to the City to determine. The amount of time needed to complete the milestones also depends on the availability of data, staff, and resources.

A local Climate Action Plan (CAP) is a customized roadmap to reduce global warming pollution by the target that Norman identifies and adopts. The CAP includes an implementation timeline for reduction measures, costs and financing mechanisms, assignments to city departments, and actions Norman must implement to achieve its target.

RECOMMENDATIONS

After reviewing the information available on Mayors' Climate Protection Agreement and assessing the recommended actions specifically mentioned in the language of the proclamation, ECAB has developed a list of top recommendations.

1. Assign adequate staffing to fulfill Norman's obligations. The amount of time required and the continuity necessary to undertake this challenge obligates a paid staff position. Volunteers can provide a meaningful supportive role, but in order to develop, implement, track, and monitor a program of this scope, a dedicated individual or group of individuals will be needed. This position could be a City employee or a contractor with a defined set of goals and objectives.
2. Financially support the effort with sufficient funds. Provisions within the agreement will require the expenditure of funds to implement and maintain the program. Although there should be a significant financial benefit realized by adopting certain aspects outlined in this agreement, an operations budget will still be required. Savings in terms of energy efficiency, operating budgets, and overall cost avoidance is anticipated to far outweigh the costs of implementing and maintaining the program.
3. Commit to the Cities for Climate Protection (CCP) Campaign. The CCP provides a five-step methodology to reduce global warming pollution. The 5 Milestones articulated by the CCP can be implemented independently or comprehensively. The CCP offers a proven reference point to cities newly engaging in climate protection actions and has resources available to foster fledgling communities.
4. Adopt a 20% emissions reduction goal by 2020. Setting a reduction target for global warming pollutants creates a tangible goal and metric to guide the planning and implementation of Norman's action. The target in the U.S. Mayors' Climate Protection Agreement is to reduce emissions by a minimum of 7 percent below 1990 levels by 2012. Almost all of the local governments participating in campaign establish reduction targets of global warming pollution at 15 percent or higher to be met within a 10 year period. It is reasonable for Norman to reach the 7% goal by 2012 with an added reduction goal totaling 20% by 2020.

In addition to these recommendations, ECAB has embraced some specific actions and ideas as having immediate and significant benefits. By adopting the following suggestions, ECAB believes there can be tangible reductions in global warming emissions. These include:

- Conducting an initial city-wide emissions inventory and periodically reevaluating the status.
- Requiring Energy Star-certified equipment on all new purchases and leases.

- Performing energy audits on all city facilities and implementing cost-effective retrofits and upgrades.
- Reducing City of Norman vehicles' emissions via alternative energy sources, fuel efficiency, alternative modes of transportation, and sprawl reduction efforts.
- Committing to purchase renewable energy by establishing a goal a 20% renewable target by 2010 and 33% renewable target by 2020 (on par with California's policy).
- Adopting LEED certification (refer to Recommended Action #7) in all new City of Norman buildings and construction.

The remainder of this document addresses and describes the 12 "Recommended Actions" outlined in the agreement. ECAB has distilled the information into 12, one-page synopses. Each page includes generic information about the subject, the benefits and need for adopting it, the applicability to Norman, and specific recommendations. ECAB has invested a significant amount of time researching and gathering information and hopes this exceeds the Mayor's expectations and serves as a tool for directing future efforts. ECAB would also like to remain active in the program and willingly offers its assistance in any form. ECAB would like to collaborate as an active participant and also serve as a monitor or in some type of program review capacity.

**RECOMMENDED ACTION #1:
INVENTORY GLOBAL WARMING EMISSIONS IN CITY AND IN THE COMMUNITY, SET
REDUCTION TARGET, AND CREATE AND ACTION PLAN**

INTRODUCTION

An inventory identifies and quantifies the global warming pollution produced by both government operations and the community at large in a particular year. The inventory and forecast provide a benchmark against which Norman can measure the progress in terms of its own operations and that of its citizens. This emissions analysis identifies the activities that contribute to emissions and the quantity of pollution generated by each of activities. An inventory is established by collecting data about energy management, recycling and waste reduction, transportation, and land use. A local government can calculate global warming pollution for a base year (e.g. 1990) and for a forecast year (e.g. 2012). Expertise in climate science is not necessary; city staff members (e.g., public works, environment or facilities departments) could conduct an inventory.

The inventory and quantification of existing climate protection measures will help guide the City of Norman to understand where they can get the largest emissions reductions. The majority of measures in CAPs fall into energy management, transportation, waste reduction, and land use. Common measures include energy efficiency improvements to municipal buildings and water treatment facilities, streetlight retrofits, public transit improvements, installation of renewable power applications, and methane recovery from waste management.

BENEFITS AND NEED

Conducting a greenhouse gas emission inventory is the first and fundamental step in developing a plan to meet Mayors' Climate Protection Agreement goals. The inventory provides the baseline information needed to set emission reduction targets and the preparation of a plan to achieve the target. Without an inventory, it will be exceedingly difficult, if not impossible, to achieve reduction targets. Much of the information needed to conduct an inventory already exists. These include electricity usage, purchase and consumption of natural gas, diesel, and gasoline, recycling rates, etc.

A community inventory of greenhouse gas emissions will require additional efforts but could be a more macro level analysis. This inventory would require the cooperation of utility companies (OG&E, OEC, ONG, petroleum companies, others) to provide information on usage of electricity, fuel, natural gas, and other greenhouse gas emission sources. A reasonably accurate inventory based on energy consumption could provide adequate information to allow establishing emission reduction targets and an action plan.

APPLICABILITY TO THE CITY OF NORMAN

As with all other participating communities, an inventory of greenhouse gas emissions by the City of Norman is the critical first step in meeting the requirements of the Mayors' Climate Protection Agreement.

RECOMMENDATIONS

It is recommended that the City of Norman inventory greenhouse gas emissions from City operations. To the extent possible, the inventory should provide emission data at the department or major operational unit level. For example, inventory data would be provided for wastewater collection and treatment operations, facilities, water treatment and distribution, etc.

City staff should determine if the availability and accessibility of data needed to inventory community-wide greenhouse gas emissions. Private companies providing energy to the City of Norman should be contacted to determine if data are available for the inventory. Existing information and resources (e.g., software) developed specifically for this program should be evaluated and utilized for this aspect.

**RECOMMENDED ACTION #2:
ADOPT & ENFORCE LAND-USE POLICIES THAT REDUCE SPRAWL, PRESERVE OPEN
SPACE, & CREATE COMPACT, WALKABLE URBAN COMMUNITIES**

INTRODUCTION:

Current development practices in Norman have resulted—to varying degrees—in the loss of open space and a dispersed community. Norman is not unique in this predicament; development across North America tends to be low density and car dependent. The effects are manifested in terms of increased economic and health costs to citizens, loss of revenue to business, consumption of productive farmland and wildlife habitat, local infrastructure strain, adverse aesthetics effects, and climate change.

Within the context of this report, the most significant issue associated with sprawl is emissions from vehicles that burn fossil fuels. Low density developments—some distance away from work, school, and services—cause inefficient use of energy and necessitate the reliance on private vehicle transportation. Sprawl requires disproportionately higher vehicle miles than compact, high density areas. This is of importance since transportation accounts for roughly 25% of the emissions related to climate change. Sprawl consumes productive farmland and open space and virtually eliminates the possibility of a compact urban area with access to stores and shops within walking or biking distance.

BENEFITS AND NEED

By far the biggest advantage to preventing sprawl is eliminating or reducing the direct and indirect impacts associated with transportation. From a climate perspective there is a tangible reduction in carbon dioxide emissions from burning fuel—approximately 20 pounds per gallon. There are also indirect benefits associated with the ancillary reductions from fuel exploration and production, vehicle manufacturing and infrastructure development—realized on the local and international levels. By creating compact, mixed use neighborhoods (i.e., residential and commercial) Norman can profit by reducing fuel consumption and by cutting utility, infrastructure, and service delivery costs. It is cheaper to operate, maintain, and replace infrastructure in compact communities—one estimate reported a ~9% savings. By preserving open space Norman can reduce temperatures commonly associated with urban areas and save emissions associated with energy consumption. These areas can also serve as carbon sinks as well as for habitat, recreation, and water quality protection purposes.

APPLICABILITY TO NORMAN

Norman has the ability to adopt, implement, and/or enhance practices to immediately address sprawl and promote compact development and the preservation of open space. Norman is a relatively large city from a land area perspective with a significant percentage yet to be developed. This affords the City time to develop efficient transportation strategies, optimize community planning, and reduce sprawl. Also, the Greenbelt Commission is uniquely suited to promote open space and greenway corridors.

RECOMMENDATIONS

The fundamental objectives can be achieved, in part, through the:

- Greenbelt Commission—proceed with stated goals/objectives and support ongoing projects;
- Norman 2025 Plan—maintain development densities to encourage growth around the urban core and on suitable lands;
- Storm Water Master Plan—adopt practices to preserve open space and discourage sprawl;
- Norman Area Land Conservancy (NALC)—involve non-government organizations to provide assistance with protecting open space through conservation easements and other mechanisms;
- Development Codes/Planning Requirements—provide incentives for compact cluster development and encourage development in suitable areas through tax breaks, subdivision regulations, and building codes.

**RECOMMENDED ACTION #3:
PROMOTE TRANSPORTATION OPTIONS SUCH AS BICYCLE TRAILS,
COMMUTE TRIP REDUCTION PROGRAMS, INCENTIVES FOR CAR POOLING AND
PUBLIC TRANSIT**

INTRODUCTION

Nearly half of the average Oklahomans' contribution of carbon dioxide (CO₂) to the atmosphere is derived from vehicle emissions. In addition to reducing our contribution to global warming, using less fuel has important economic and national security implications for the United States. We are all aware of programs designed to reduce our use of gasoline, from the manufacture of hybrid vehicles to mandated mileage standards. Reducing America's use of fossil fuels, including gasoline, can and should start at home; and as THE university town in Oklahoma, Norman has an excellent opportunity to lead the way in reducing gasoline usage for the rest of the State.

BENEFITS AND NEED

In addition to reducing Norman's CO₂ emissions, instituting these programs have additional benefits. Using Cleveland Area Rapid Transit (CART) and car-pooling reduces traffic congestion (a primary concern of many Normanites) on Norman's streets; this reduces the need for more and wider roads and other traffic-related infrastructure, thereby allowing our tax dollars to be devoted to more worthwhile uses. The development of bicycle and walking trails realizes all these benefits plus encourages a healthy lifestyle.

APPLICABILITY TO NORMAN

Norman already has the beginnings of a bicycle trail network, several bicycle clubs and organizations, and a City bicycle committee. Norman also has a viable public transportation system that transports 900,000 riders. Information from these could form the basis for substantially improving Norman's commitment to reducing gasoline usage.

For each mile we drive in our car, we emit one pound of CO₂ into the atmosphere. Norman has the opportunity to lead the State in reducing unnecessary CO₂ emissions, reducing traffic congestion, reducing the need for traffic-related infrastructure, affording an independent lifestyle for our disabled citizens, and promoting a healthy lifestyle for all of us. And Norman already has active, committed groups and constituencies whose expertise can be utilized to realize the Mayor's action item on transportation options.

RECOMMENDATIONS

In order to implement the mayors' action item on transportation items, the City of Norman should work with interested and knowledgeable parties to complete a number of initiatives.

- Norman should develop an extensive system of bicycle and walking trails and support facilities such as bike racks and road signs (see www.ci.norman.ok.us/parks/bike_program.htm). Bike trails should be developed to connect schools, parks, OU, shopping areas, and Lake Thunderbird. Norman should work towards becoming a "Bike Friendly Community" (see www.bikeleague.org/programs/communities/); this designation would be yet another factor that would attract people to live in Norman.
- Norman should continue to support and possibly expand the CART system. An additional benefit of the system is that disabled riders are able to use the lift-equipped buses, affording them a more independent lifestyle.
- Norman should encourage car pooling to work. This is an old, but viable, way for individuals to save gas.

RECOMMENDED ACTION #4: INCREASE THE USE OF CLEAN, ALTERNATE ENERGY

INTRODUCTION

More than 50% of our electricity in Oklahoma comes from burning coal, most of which is imported from Wyoming. Both of Norman's suppliers, OG&E and OEC, have plans to build sizable new conventional coal-burning power plants. Oklahoma has significant wind resources and our 675 MW of wind projects ranks 5th nationally (Texas is #1). Approximately 2% of Oklahoma's electricity comes from wind power. In Denmark approximately 20% of the electricity comes from wind, and in several German provinces wind power provides over 40% of the electricity. A recent draft report from the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory showed that with proper transmission line construction (which is the limiting factor for increased wind energy in the state) Oklahoma could have over 25,000 MW of installed wind capacity, representing a \$35 billion investment, by 2030. Oklahoma is also the technology and manufacturing leader in the area of geothermal heating and cooling.

BENEFITS AND NEEDS

There are environmental, health, and economic benefits to substituting a combination of conservation, renewable energy, and natural gas for coal. The environmental benefit is in the reduction of CO₂, sulfur oxides (SO_x), nitrogen oxides (NO_x), mercury, and particulates. Coal burning power plants are the single largest contributors to greenhouse gas emissions. Natural gas also contributes, but at a specific pounds/kWh rate approximately half that of coal. Conservation and renewable energy have no emissions. The particulates from coal burning contribute to respiratory health problems and mercury deposition from power plant effluent has emerged as a significant health concern. From an economic standpoint increased coal usage means more money slips out of the Oklahoma economy to import fuel. Coal imports currently cost approximately \$300 million a year. If, as many people expect, the federal government imposes some sort of a carbon tax or limit in the future, Oklahoma ratepayers will likely bear this burden through the fuel adjustment clause pass-through. If natural gas stays above \$6/MCF wind power will actually save money for consumers. In fact, OG&E customers that signed up for 100% wind power realized a savings of ~5-10% last summer when natural gas reached record highs.

APPLICABILITY TO NORMAN

Norman has the highest subscription rate in the State to the voluntary OG&E wind power program. It is also home to Bergey Windpower, a leading worldwide manufacturer of small wind turbines. OG&E promotes geothermal heatpumps and offers financing. There seems to be significant interest in alternate energy in Norman. Norman does not have a municipal electric system, however, so it does not have direct control of its sources of electricity, but the City could still purchase some portion of its electricity from renewable sources.

RECOMMENDATIONS

The most effective way to increase the use of alternate energy is to implement two programs, a Renewable Portfolio Standard (RPS) and a Systems Benefit Fund (SBF). Twenty-four states and 3 cities have enacted RPSs, which mandate a certain percentage of renewable energy by certain deadlines. Eighteen states and 1 city have enacted SBFs, which add a small surcharge on electricity sales and use the collected funds to provide rebates for conservation and/or renewable energy investments.

After gaining support from the City Council, the City of Norman, with ECAB's assistance, should enter into discussions with OG&E and OEC towards adopting and implementing the following:

- For city facilities and operations, adopt the California RPS mandates of 20% renewable energy by 2010 and 33% by 2020. Set a similar, but voluntary, goal for Norman.
- Create a SBF (Norman Clean Energy Fund) program to help fund small scale renewables and energy efficiency rebates in Norman.

**RECOMMENDED ACTION #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**

INTRODUCTION

Energy efficiency programs offer one of the best ways to reduce global warming emissions. A large share of fossil fuel use is dedicated to generating the electricity that powers almost all aspects of our daily lives. Globally, 75 percent of all energy is consumed in cities. In addition, state and local governments spend upwards of \$40 billion a year on energy consuming products and equipment.

BENEFITS AND NEEDS

The City of Norman can provide leadership to the community by making energy efficiency a priority. Through phased purchases of energy efficient equipment, lighting, heating ventilation and air conditioning (HVAC) equipment, etc., the City will be able to reduce demand for energy (e.g., natural gas and electricity). Reductions in demand will save limited tax dollars and will reduce greenhouse gas emissions. Building code improvements requiring the use of high R-value insulation, double/triple pane windows, and other construction practices have been shown to have a quick return on investment—typically less than 5 years. These improvements result in more energy efficient buildings, which translates into reduced energy consumption and greenhouse gas emissions.

APPLICABILITY TO NORMAN

The following recommendations are listed in the Climate Change Handbook published as a guidance document for the Mayors' Climate Agreement. The list is not exhaustive, but it provides common sense and easily implemented recommendations (assuming there is political leadership and will) that can be adopted. All of these recommendations are applicable to the City of Norman as well as communities throughout the United States.

RECOMMENDATIONS

Municipal Short Term Goals

- Install energy-efficient exit sign lighting;
- Perform energy-efficient building lighting retrofits;
- Institute a “lights out at night” policy;
- Institute a “lights out when not in use” policy;
- Install building/office occupancy sensors;
- Purchase only ENERGY STAR equipment and appliances for City use. Negotiate prices by purchasing in bulk where feasible.

Municipal Long Term Goals

- Conduct an energy audit of municipal facilities;
- Implement an energy tracking and management system;
- Perform heating, cooling and ventilation system retrofits (e.g. chillers, boilers, fans, pumps, belts, fuel-switching from electric to gas heating);
- Install ENERGY STAR appliances – and require this and the following in specs/purchasing RFPs;
- Install green or reflective roofing;
- Improve water pumping energy efficiency;
- Install energy-efficient vending machines;
- Install energy-efficient traffic lights;
- Install energy-efficient street lights (e.g., high pressure sodium);

- Decrease average daily time for street light operation.

Community Short Term Goals

- Adopt stringent residential or commercial energy code requirements;
- Promote energy conservation through campaigns targeted at residents and businesses.

Community Long Term Goals

- Implement a low-income weatherization program;
- Implement district heating and cooling;
- Implement time-of-use or peak demand energy pricing;
- Install energy-efficient co-generation power production facilities;
- Launch an “energy efficiency challenge” campaign for community residents;
- Promote participation in a local green business program;
- Promote the purchase of ENERGY STAR appliances;
- Promote water conservation through technological and behavioral modification.

**RECOMMENDED ACTION #6:
PURCHASE ONLY ENERGY STAR EQUIPMENT AND APPLIANCES FOR CITY USE**

INTRODUCTION

The Energy Star Program, initiated in 1992, is a public-private partnership led by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) to bring the value of energy efficiency to their customers, the public, and themselves while helping to protect our environment. More than 8,000 Energy Star partner organizations have committed to improving and promoting energy efficiency of products, homes, and businesses. The Energy Star Program includes equipment and building efficiency. The Energy Star Program is a major component of EPA's climate change program by encouraging energy efficiency. Most electricity in Oklahoma is generated by burning fossil fuels (i.e., natural gas and coal) that result in greenhouse gas emissions. Energy efficiency that reduces electricity demand has a direct effect on emissions and saves money.

According to the EPA, many industries and commercial building owners have achieved 30 percent reductions in energy use through cost-effective investments in energy efficiency. These reductions have occurred without a loss in service compared to standard technology. Typically, Energy Star-certified equipment is either very competitive in price with or is the same price as non-certified equipment. Energy Star-certified equipment must meet eligibility criteria issued by EPA and DOE and generally is at least 15 to 25 percent more efficient than minimum government standards.

BENEFITS AND NEEDS

Purchase of Energy Star-certified equipment will result in reduced electricity consumption and has a direct effect on greenhouse gas reductions. A reduction in electricity consumption saves money. Thousands of businesses and government agencies at the local, state, and federal levels have implemented policies that require all Energy Star-certified equipment. These policies have applied to both purchased and leased equipment. Very few equipment types do not include Energy Star certification.

There are numerous examples where use of Energy Star-certified equipment has resulted in significant savings. For example, replacement of conventional traffic signals with those using light emitting diodes (LEDs) at 100 intersections saved one community \$132,000 per year in energy and maintenance cost. Over the life cycle of these signals, approximately \$1.1 million will be saved and 12,356 tons of carbon dioxide (CO₂) emission reductions will be achieved.

APPLICABILITY TO THE CITY OF NORMAN

Use of Energy Star-certified equipment by the City of Norman can be easily implemented through the procurement process. Other cities and businesses throughout the United States have implemented policies requiring the purchase and/or lease of equipment that carries the "Energy Star" certification. Examples of some of the Energy Star-certified equipment categories include: office equipment (computers, copies, fax, etc.), vending machines, heating ventilation, air conditioning (HVAC) systems, audio-visual equipment, lighting (including replacement with compact fluorescent bulbs), appliances, windows, thermostats, pumps, motors, and other industrial equipment.

RECOMMENDATIONS

- It is recommended that all future equipment purchases/leases shall be Energy Star-certified. If Energy Star-certified equipment is not specified, a department manager shall provide a written justification why Energy Star-certified equipment is not proposed prior to the purchase or lease.
- The City should maintain a record of the anticipated energy savings as non-Energy Star-certified equipment is replaced. This will allow for determining greenhouse gas reductions attributable to reduced electricity consumption.

**RECOMMENDED ACTION #7:
PRACTICE AND PROMOTE SUSTAINABLE BUILDING PRACTICES USING THE U.S.
GREEN BUILDING COUNCIL'S LEED PROGRAM OR A SIMILAR SYSTEM**

INTRODUCTION

Cities across the country are passing ordinances to mandate that municipal buildings meet green building standards. One of the most frequently cited standards are those set by the Leadership in Energy and Environmental Design (LEED) program of the U.S. Green Building Council and the U.S. EPA and the Department of Energy's ENERGY STAR program. This series of programs for new and existing buildings, as well as community design, provides a framework for cities to begin implementing energy efficiency and green building techniques that save thousands of dollars and reduce greenhouse gas emissions.

LEED was created to:

1. define "green building" by establishing a common standard of measurement
2. promote integrated, whole building design practices
3. recognize environmental leadership in the building industry
4. stimulate green competition
5. raise consumer awareness of green building benefits
6. transform the building market

BENEFITS AND NEEDS

LEED provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

APPLICABILITY TO NORMAN

The City of Norman occasionally builds facilities that could be designed to meet LEED accreditation standards. Examples are the new convention center (indirectly) and the upcoming new library. The City also has some influence with the private and public sector entities that build the majority of the homes and buildings in Norman. The OU School of Architecture has people with expertise in LEED and they would welcome an opportunity to work with the City in this area.

RECOMMENDATIONS

Short term, the City should:

- Encourage modest and reasonable (due to construction schedule) LEED interventions for the new convention center;
- Encourage public and private sector adoption of LEED in new construction;
- Add LEED expertise to the ECAB and/or City staff;
- Cultivate a relationship with LEED practitioners at the OU School of Architecture.

Long term, the City should:

- Require some or all new city government construction projects be LEED certified;
- Require some or all retrofit city government projects become LEED certified;
- Encourage incentives or mandate developers to construct LEED certified or ENERGYSTAR homes.

**RECOMMENDED ACTION #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**

INTRODUCTION

Automobiles are a leading cause of global warming. Nationally the transportation sector is one of the largest sources of U.S. emissions, representing nearly one-third of total emissions. It is hard to visualize, but every gallon of gasoline burned emits 20 pounds of carbon dioxide—the principal global warming pollutant.

BENEFITS AND NEED

Actions that reduce global warming also reduce fuel use, minimize costs for local governments, help cities comply with federal air quality regulations, and improve community livability.

APPLICABILITY TO NORMAN

The City of Norman has instituted many programs to assist in meeting the goal of increasing fuel efficiency. These include:

- A 30% reduction in fuel consumption has been established.
- A Fuel Review board has been created consisting of five Department Heads of the largest fuel consuming departments.
- Fleet has been asked to evaluate administrative vehicles that get up to 25-30 mpg.
- Hybrid vehicles have been purchased for the Environmental Services Section and the Water Treatment Facility.

RECOMMENDATIONS

It is important that the above items be reviewed and implemented. A 30% reduction in municipal fleet fuel consumption can be accomplished by adopting many practices, including but not limited to:

- Restrict idling of municipal vehicles;
- Retire old and under-used vehicles;
- Purchase fuel efficient (e.g., hybrid) and/or smaller fleet vehicles;
- Perform regular preventative maintenance on vehicles;
- Utilize fuel efficient vehicles for parking enforcement;
- Utilize alternative fuel vehicles (e.g., biodeisel, ethanol, electric, compressed natural gas) for city fleet;
- Adopt a public education outreach program for reducing fuel usage.

**RECOMMENDED ACTION #9:
EVALUATE OPPORTUNITIES TO INCREASE PUMP EFFICIENCY IN WATER AND
WASTEWATER SYSTEMS; RECOVER WASTEWATER TREATMENT METHANE FOR
ENERGY PRODUCTION**

INTRODUCTION

Nationwide, drinking water and wastewater systems cost more than \$4 billion a year in energy costs to pump, treat, deliver, collect, and clean water—with the majority of this cost borne by municipalities. The energy cost to run drinking water and wastewater systems can represent as much as one-third of a municipality's energy bill and this is often the single largest utility expenditure for a city. Water conservation plays a big part in reducing energy costs for the water and wastewater treatment facilities. If less water is used, not as much water will need to be treated by either the water treatment facility or the wastewater treatment facility, therefore reducing electricity needs.

BENEFITS AND NEEDS

By increasing pumping efficiencies and reducing the energy usage at water and wastewater treatment facilities less electricity will be used resulting in a decrease in emissions and a decrease in the amount of electricity purchased. A plant that converts methane into electricity, generating power is a virtually pollution free operation. Added benefits are manifold-methane and air pollutants are reduced, as is the amount of electricity purchased from utilities that operate fossil fuel burning power plants, and the fuel is free because methane is produced during the wastewater treatment process.

APPLICABILITY TO NORMAN

The wastewater plant has a co-generator (co-gen) unit which is set up to recover methane (bio-gas) for energy production. Currently the wastewater plant has no means of compressing and storing bio-gas which means the co-gen needs to be fueled by bio-gas and natural gas as a blend. The high cost of natural gas makes the system cost prohibitive unless a bio-gas storage sphere and gas compression equipment can be purchased and utilized. In addition, many of the newer additions to the wastewater facility are not tied directly to the co-gen. It would be important to tie these units into the co-gen to utilize as much of the energy on site as possible (which maximizes the value of the electricity produced).

The water treatment plant is undergoing a thorough engineering review. The City will be reviewing the electrical efficiency of the entire plant, which will include pumps, motors, operational equipment and plant wiring. In addition, the efficiencies of the chemical feed facilities will be assessed; this includes reviewing the chemical feed equipment for proper sizing and flow pacing to save chemicals, as well as introducing possible new processes to treat the water. Power costs and pump efficiencies will be evaluated when the SCADA system is up and operating at the water treatment facility.

The Central Oklahoma Master Conservancy District is in the process of gaining City's approval for issuing \$2.3 million in bonds. A large part of the money will be to update the pumping facilities. They will purchase more efficient pumps and new variable frequency drive motors. The new pumps and motors should save approximately \$100,000 per year in electrical costs alone.

RECOMMENDATIONS

The above items should be reviewed and the viable energy efficient alternatives should be implemented including the purchase of a bio-sphere, gas compression equipment, and energy efficient pump and motors.

**RECOMMENDED ACTION #10:
INCREASE RECYCLING RATES IN CITY OPERATIONS AND IN THE COMMUNITY**

INTRODUCTION

Recycling plays an important role in reducing global warming emissions. Because recycling saves energy, conserves resources, lower emissions from incinerators, reduces landfill methane releases, and increases carbon storage in trees, it is effective in reducing greenhouse gasses. Also, the steps in supplying recycled materials to industry (including collection, processing and transportation) typically use less energy than the steps in supplying virgin materials to industry (including extraction, refining, transportation, and processing).

BENEFITS AND NEED

In general, manufacturing using recycled materials requires markedly less energy than when virgin materials are used. For instance, it takes 95% less energy to recycle aluminum than it does to make it from raw materials. Making recycled steel saves 60%, recycled paper 50%, recycled newsprint 40%, recycled plastics 70%, and recycled glass 40%. These savings far outweigh the energy created as by-products of incineration and landfilling. Consequently, there can be a direct benefit realized in terms of reduced carbon dioxide emissions from fossil fuel combustions and reduced methane generation from decomposing organic mater in landfills. In 2005 recycling was projected to have saved the equivalent amount of energy as needed for 9 million homes or 900 trillion BTUs. Another estimate claims that a national recycling rate of 30% would equate, in terms of reduced greenhouse emissions, to saving the emissions from 25 million cars.

APPLICABILITY TO NORMAN

Norman utilities superintendent Scottie Williams estimated that Norman residents throw away 350-400 tons of solid waste per day of which 33% could be recycled. In 2005 the three Norman recycling centers and the compost facility diverted approximately 2,117 tons of solid waste and composted 7,317 tons of green waste, respectively. This amount could be increased significantly if recycling was made a bigger priority. Within the Norman community, there are resources and strong support to expand recycling efforts—based on the results of the C.O.R.E. survey. Local schools, churches and other organizations actively participate in Abitibi-Consolidated’s recycling fundraising program, and the University of Oklahoma administers its own recycling program. More telling is that fact that Tulsa, Oklahoma City and Edmond already provide curbside recycling services, while Norman lags behind.

RECOMMENDATIONS

With the growing public concern over global warming, the City should go public with the mayor’s endorsement of the U.S. Mayors’ Climate Protection Agreement and challenge residents, businesses and organizations to join the effort. The City should:

- Set goals to reduce waste and improve recycling rates (e.g., 20% by 2020 with a 30% overall goal);
- Require mandatory recycling in all City offices;
- Adopt EPA procurement guidelines for recycled content in new products;
- Add more recycling centers and provide curbside pickup;
- Educate the public on the high costs of solid waste through press releases and announcements in utility bills and on its website;
- Partner with local environmental groups and the Chamber of Commerce to promote recycling;
- Disseminate information on what can be recycled, where and how to recycle, and the costs and benefits of recycling;
- Advertise through multiple media campaigns, utility bill inserts, news articles, flyers, etc.; and
- Develop a Norman Green Page or a dedicated page for recycling and other environmental issues.

**RECOMMENDED ACTION #11:
MAINTAIN HEALTHY URBAN FORESTS; PROMOTE TREE PLANTING
TO INCREASE SHADING AND ABSORB CO₂**

INTRODUCTION

Ideally, carbon dioxide (CO₂) production by animals is balanced by use by plants. As the population grows world wide, so industry and agriculture expand. Consequently, forests and vegetation are removed and this balance is lost, causing an increase in CO₂. Calculations show an average of 40% of a residential lot is covered by structures and paving with commercial coverage even higher.

BENEFITS AND NEEDS

American cities have a history of establishing for themselves the sheltered environment of shade trees. Norman has a long tradition as a tree-planting community having been established on the barren edge of the southwestern plains. The maintenance and continuance of this tradition will need to expand as the city grows. Urban growth in Norman has reduced the percentage of tree canopy from 34.5% to 17%. Healthy, older trees and new canopy growth will prevent heat absorption by structures, streets and parking lots which in turn reduce emissions associated with air conditioning. Norman needs to address adequate replacement of vegetation lost to expansion.

APPLICABILITY TO NORMAN

Norman is historically well established to meet this challenge. The lists of community- and Council-mandated volunteer groups are outstanding in our City. The city government has created a Tree Board that is currently working with developers on a suggested policy goal for minimum tree-planting requirements in new residential developments. The City has a full-time Forester and a City Forestry Division. The Parks Department has been awarded grants for trees and landscaping. A Norman Neighbor Woods tree-planting program implemented and planted 450 trees. A Big Tree contest brought attention to some of our aging trees. An ongoing Tree Tenders Program was initiated to utilize volunteers to identify tree needs and offer their expertise. The City has organized Arbor Day celebrations and Norman has been awarded Tree City USA status for four years. The Tree Board is producing an Urban Forestry Master Plan. In conjunction with the Norman Developers Council, the Board is formulating a Heritage Tree Program that will grow seedlings from older parts of Norman to be distributed free of charge to neighborhoods.

RECOMMENDATIONS

Norman City policy makers must continue and increase the level of support shown above. Public moneys must be allocated to help achieve a 35% of tree canopy for Norman. Money will be needed to provide for the care of trees in public places. Innovative financing should be sought to provide for the care and replacement of trees on public lands and commercial sites. The health of existing trees needs to be monitored and tree-trimming practices regulated more carefully. The City must also recognize that some trees are more appropriate for Norman's climate than others. In addition, the City should consider xeriscaping wherever possible.

Norman has worked hard to create a beautiful city. The tree canopy we achieved in the past was part of that effort. Now we have a more urgent need - the reduction of CO₂. We can be a model for slowing this increase. We need to expand efforts and address all the costs of development and the related removal of vegetation. That removal must be addressed. This is ours to do, locally, so that we can have our beauty and breathe in it, too.

**RECOMMENDED ACTION #12:
HELP EDUCATE THE PUBLIC, SCHOOLS, OTHER JURISDICTIONS,
PROFESSIONAL ASSOCIATIONS, BUSINESSES AND INDUSTRY
ABOUT REDUCING GLOBAL WARMING POLLUTION**

INTRODUCTION

A recent MIT survey reported that Americans rank climate change as the most pressing environmental problem. “Almost 3/4ths of those surveyed felt that government should do more to deal with global warming, and individuals were willing to spend their own money to help.” You can’t read a newspaper, e-zine, or listen to news programs on television or the radio without hearing about global warming. While the record setting crowd at Al Gore’s recent visit to OU may have been due in small part to instructors promising students extra credit to attend, it did not account for the thousands of non-students in the audience. People are interested and worried. They want to know how their local, state and federal governments are responding to global warming. More importantly, they are eager to help and want to know more about what they can do.

BENEFITS AND NEED

The benefits of reducing greenhouse-gas emissions are well known and generally accepted by the public, but many people do not know how they can easily reduce their personal contribution to global warming. A number of websites have been established to assist the layperson in this endeavor (e.g., 2006 Survey of Public Attitudes on Energy and the Environment (<http://sequestration.mit.edu/research/survey2006.html>), Yale School of Forestry & Environmental Studies Project: Americans and Climate Change (<http://environment.yale.edu/climate/>), Oklahoma Office of the Secretary of State Environmental Education Resource Guide (<http://www.deq.state.ok.us/pubs/lpd/EEguide04.pdf>), U.S. Environmental Protection Agency Educational Resources (<http://www.epa.gov/epahome/educational.htm>), Sierra Club’s Ten Things You Can Do To Help Curb Global Warming (<http://www.sierraclub.org/globalwarming/tenthings/>), Oklahoma Department of Environmental Quality Environmental Education Resources (<http://www.deq.state.ok.us/mainlinks/eeepage.htm>), Union of Concerned Scientists What You Can Do (http://www.ucsusa.org/global_warming/solutions/ten-personal-solutions.html?print=t), and U.S. Public Interest Research Group Fact Sheet 10 Things You Can Do (<http://uspirg.org/uspirg.asp?id2=7629&id3=USPIRG&ID4=fs&>).

APPLICABILITY TO NORMAN

Norman has always possessed a rare and positive quality of life that continues to bring people back to it. Visitors and college students often return to make their homes here. It has the reputation of being one of the most, if not the most, progressive and livable cities in Oklahoma. With the University of Oklahoma, the National Weather Center and other research institutions located here, Norman has the resources to take a leadership role in improving environmental literacy throughout Oklahoma.

RECOMMENDATIONS

The Mayor of Norman is the only mayor in Oklahoma to sign the U.S. Mayors’ Climate Control Agreement. The City needs to lead by example, inform the community of what it has done to reduce carbon emissions and what it plans to do in the future. This is particularly critical in the Midwestern part of the U.S., where climate change education seems to be lagging compared to that on the coasts. The City needs to challenge and engage local businesses and organizations and other Oklahoma cities to become partners in the effort because this issue is one that demands collective action. It needs to tell its citizens what they can do to help using the City’s website, utility bill inserts, press releases, the annual household hazardous waste collection events, and active participation and sponsorship of local and state environmental events and initiatives.