
ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

**FAIRFAX COUNTY
AND GLOBAL
CLIMATE CHANGE**

II. FAIRFAX COUNTY AND GLOBAL CLIMATE CHANGE

A. INTRODUCTION AND BACKGROUND

In the summer of 2006, Fairfax County was approached by the Sierra Club and was asked to join its Cool Cities Program. This program was designed to help cities meet the conditions of the U.S. Mayors Climate Protection Agreement, which was to reduce their greenhouse gas outputs 7 percent below their 1990 levels by 2012. After carefully reviewing the Cool Cities protocol, county staff recommended against participation in that specific program. However, at the insistence of the Chairman and other members of the Fairfax County Board of Supervisors, county staff was asked to develop a program that would be more robust and contain similar goals and be better suited to county protocols. This program, Cool Counties, which was first mentioned by Chairman Gerald E. Connolly in his 2007 State of the County address, was developed in collaboration with the Sierra Club and other local government partners, and was officially unveiled in July 2007 at the National Association of Counties annual conference that was held in Richmond, Virginia. Much of what Fairfax County lists within the framework of this Cool Counties program was initiated previously to address clean water and clean air issues. However, on October 1, 2007, county staff presented its climate change initiatives as part of its fiscal year 2009 Environmental Improvement Program (<http://www.fairfaxcounty.gov/living/environment/eip/>).

Solving climate change is admittedly a daunting task by any measure, but we as county governments have a unique role to play in this effort. Through our regional cooperation and influence on major environmental policy and operations like air quality, land use planning and zoning, transportation, forest preservation, solid waste management and recycling and water conservation, we can lead by example by looking at our own operations to assess what policy or program changes we have the authority and resources to enact in order to lower the emissions produced by our operations.

Fairfax County has already taken a number of these actions, such as purchasing hybrid vehicles, promoting green buildings, purchasing wind power and teleworking to name just a few. Fairfax now has 104 hybrids in its vehicle fleet. In 2006, the county converted one of its Toyota Priuses to a “plug-in-hybrid-electric” vehicle. This car travels up to 30 miles on electric power alone before dual power is used; it could have a fuel efficiency averaging over 100 miles per gallon of gas.

In addition, Fairfax County purchased 5.8 million kilowatt hours of wind energy per year during a two-year contract from April 2005 through March 2007. The wind energy contract resulted in a reduction of 6.2 million pounds of CO₂ over the contract period. In April 2007, the county signed a new three-year wind energy

purchase contract with 3-Phases Climate Solutions, Inc. Fairfax County will continue the commitment of purchasing 5 percent of the general county's electricity from wind energy in 2007 and 2008 and will expand to 10 percent of the general county usage in 2009.

Telework is another effective tool for reducing our CO₂ emissions by taking cars off our roadways and commuters out of already-crowded trains and buses. Removing just five percent of cars from the road reduces traffic congestion by up to 20 percent. In 2000, the Metropolitan Washington Council of Governments set the goal of having at least 20 percent of all eligible workers in our region telecommuting one day a week by 2005. All 17 jurisdictions in the region endorsed that goal, and Fairfax County was the first to achieve it.

A few additional examples of current county efforts that support greenhouse gas reductions include:

1. Land Use and Transportation Solutions

a. Board of Supervisors' Environmental Agenda and the Fairfax County Comprehensive Plan

Both the Board of Supervisors' Environmental Agenda and the county's Comprehensive Plan support development in transit-oriented, pedestrian friendly, mixed use centers. The concentration of new development in relatively high intensity, transit-oriented centers characterized by a mix of residential, employment and retail uses, and the provision of opportunities for non-motorized transportation to, from and within these centers should serve to reduce, in aggregate, the number of motor vehicle trips and vehicle miles traveled, and the associated CO₂ emissions, that would otherwise occur through more traditional suburban development patterns in the region. Numerous Area Plan Amendment and zoning actions have been taken to encourage and implement this approach to development, and the Board of Supervisors has adopted a definition and guidance for transit-oriented development in the Comprehensive Plan.

b. Ride Sharing, Telework and Other Transportation Policies

Transportation policies that serve to reduce vehicle trips and vehicle miles traveled (e.g., provision of transit support facilities; transportation demand management efforts such as ride sharing programs and incentives, telework opportunities, bicycle parking and shower facilities in offices, shuttle bus service, transit incentives, etc.) are implemented routinely through the zoning process.

c. Transportation Programs

Numerous transportation programs are also in place that serve to reduce vehicle trips and vehicle miles traveled, therefore reducing overall CO₂ emissions. These include:

- **Employer Services Program** – This program promotes transportation demand management strategies and associated outreach efforts to employers in Fairfax County, thereby reducing single occupancy vehicle trips.
- **South County Bus Plan** – This program has increased bus ridership significantly on Richmond Highway.
- **Fairfax County Transit Program** – This multi-modal transportation program supports Metro and Virginia Railway Express services. Metrorail trains will soon expand to eight car trains, VRE is replacing existing cars with double deck passenger cars, and CUE bus service will continue to be subsidized. Ridership on all transit systems (Fairfax Connector, Metro, VRE) serving the county has increased. To further encourage the use of mass transit, on Code Red and Code Purple Days, transit systems throughout the entire region offer free rides to all passengers.
- **Metrocheck** – This is a fare card voucher program that benefits employees using public transportation. Fairfax County's Employees Transportation Benefits Program provides up to \$105.00 per employee for transportation by bus, rail or vanpool.
- **Ridesources** – This program provides ridematching services to county employees and residents along with a marketing program to encourage its use.
- **County telework program** -- Currently, more than 1,300 county employees telework. Fairfax County is the first jurisdiction to reach — and then exceed — the regional goal set by the Metropolitan Washington Council of Governments to have 20 percent of the eligible workforce teleworking by the end of 2005. The county's outreach efforts on telework and other transportation demand management efforts have broader benefits countywide.

Facilities that support non-motorized transportation also serve to reduce motor vehicle trips and motor vehicle miles traveled. The county has provided substantial funding for the construction of trails in support of non-motorized transportation.

d. Tree preservation and planting

Planting efforts can also reduce CO₂ concentrations, as trees sequester carbon by absorbing CO₂ during photosynthesis and by storing carbon as biomass. For every acre of forest that the county is able to preserve and keep healthy, approximately 20 to 30 tons of carbon is stored. Fairfax County's tree canopy is currently estimated to cover 41 percent (104,000 acres) of the county; therefore, this equates to between roughly two and three million tons of carbon storage. An earlier study estimated that the biomass of the county's tree canopy stored over 3.5 million tons of carbon. It has also been estimated that the county's current tree canopy absorbs and stores an additional 11,700 tons of carbon annually. A single tree is capable of absorbing and storing an additional 600 to 700 pounds of carbon per year. It has therefore been calculated that between 110 and 130 trees can offset the carbon "footprint" (77,400 pounds of carbon dioxide) that is estimated to be produced by each household in Virginia annually. These data underscore the value of the county's urban forestry programs and other efforts that serve to protect and restore tree cover.

Requirements for the preservation of Resource Protection Areas and commitments during the zoning process to tree preservation efforts, landscaping efforts and the preservation and restoration of Environmental Quality Corridors all serve to enhance overall carbon sequestration, thereby supporting reduced atmospheric CO₂ concentrations. The establishment and enforcement of limits of clearing and grading on site plans, subdivision plans and grading plans also support reductions in CO₂ concentrations, as do tree planting initiatives and public outreach focusing on land stewardship issues such as tree preservation and planting.

The Fairfax County Board of Supervisors has adopted a tree canopy cover goal for the county of 45 percent coverage by the year 2037 and has approved a tree conservation ordinance to strengthen tree preservation policies and procedures. In addition, trees were identified as a special area of interest in the FY 2008 Environmental Improvement Program.

The county continues to support legislative efforts to strengthen local government authority to require tree preservation during development.

2. Energy Efficiency Solutions

a. Green Buildings

Fairfax County has adopted green building policies addressing its own capital projects as well as private sector development. Under the Sustainable Development Policy for Capital Projects (adopted by the Board of Supervisors on February 11, 2008), county projects greater than 10,000

square feet in size have a goal of achieving LEED[®] Silver certification; smaller facilities are recommended for LEED certification.

The Department of Public Works and Environmental Services has also accomplished innovative energy saving measures in many of its industrial plant processes. For example, the Noman M. Cole, Jr. Pollution Control Plant uses methane gas from landfills in its sludge burning process. As noted below, methane gas is also used to generate electricity at the I-95 Landfill site. The Division of Solid Waste collects and transports trash in Fairfax County to produce electricity in the Waste to Energy Facility. The Fairfax Center and Crosspointe Fire Stations, both of which are green building projects, opened recently. DPWES is incorporating the green building approach on nearly twenty active building development projects. The Park Authority will also be using green building technology on an expansion to one of its recreation centers.

On December 3, 2007, the Board of Supervisors adopted an amendment to the Policy Plan volume of the Comprehensive Plan that incorporated within the Plan support for green building practices and that served to promote the application of these practices. Included in the amendment were new policies establishing linkages between the incorporation of green building/energy conservation practices and the attainment of certain Comprehensive Plan Options, planned uses or densities/intensities of development. In the county's growth centers, commitments for green building practices sufficient to attain certification through the LEED program or its equivalent are expected for certain nonresidential and multi-story multifamily residential proposals (e.g., proposals seeking development at the high end of the planned density/intensity range; development seeking a Comprehensive Plan Option; development involving a change in use from what would be allowed as a permitted use under existing zoning; development at a planned Overlay Level). ENERGY STAR[®] Qualified Homes designations are expected for any other residential development proposed at the high end of the Plan density range.

b. Energy Efficiency

The county's Facilities Management Department has started an energy efficiency program for the buildings in its inventory. In 2005, 4,232,639 kWh were saved and in 2006 an additional 2,398,036 kWh were saved. Natural gas consumption was also reduced by 111,440 therms per year. Cost avoidance has been over \$4.0 million since 2001. These savings would be higher but for the new square footage that came on line during those fiscal years. This department has set an internal goal of a one percent annual reduction in kBtu/SF; recent numbers show an annual reduction averaging 1.9 percent. The annual savings are cumulative; therefore, after a

10 year period, reductions of 10-20 percent in energy usage per square foot are expected.

The Park Authority has begun to initiate the lighting retrofit, energy efficient motor upgrades, and automated controls portion of the Park Authority's energy management effort at eight recreation facilities. The Park Authority is committed to programmatically addressing energy management and has established an internal position to coordinate energy management initiatives and conservation throughout the agency. Once the project is complete in late 2008, the Park Authority will reduce costs and energy consumption by 16 percent in the facilities currently operating with antiquated systems while paying for itself within 2.7 years. These energy savings retrofit replacements will reap long term, system-wide environmental and cost benefits.

Lighting Retrofits (\$107,120) consist of installation of T8 Lamps and electronic ballasts, LED exit signs, replacement of 400-watt high intensity discharge lamps with 300-watt HID lamps, compact florescent lamps vs. incandescent lamps and occupancy sensors at targeted locations. Annual savings are estimated at \$60,358 per year.

Control Installations (\$234,840) consist of Web based wireless control of key mechanical systems to allow automatic run time scheduling, phased start up to avoid peak demand utility penalty charges, remote access and run time history reporting. Annual savings are estimated at \$70,493 per year.

Motor Replacements (\$43,260) consist of replacing 20 horsepower or larger motors, with 95 percent (or even higher efficiency) efficiency optimizing units for pool pumps and air handling units. Annual savings are estimated at \$16,068 per year.

3. Renewable Energy Solutions

a. Wind Energy Purchase

The county purchased 5.8 million kWh of wind energy in 2005 from Washington Gas Energy Services/Community Energy/Mountaineer Wind Farm in West Virginia, bringing a reduction of 6.2 million pounds of CO₂ in the two-year contract. Fairfax County will continue the commitment of purchasing five percent of the general county's energy from wind in 2007 and expand to 7.5 percent and 10 percent of the general county usage in 2008 and 2009, respectively. The new three year contract will bring a further reduction of 23,600 metric tons of CO₂.

b. Waste-to-Energy

The county has adopted a waste-to-energy approach, recovering methane, controlling nitrous oxide and generating electricity from solid waste. Methane traps 21 times more heat per molecule than CO₂, and nitrous oxide absorbs 310 times more heat. The waste-to-energy plant at the I-95 Landfill generates over 80MW of electricity, offsetting an estimated 1,000,000 tons (approximately) of CO₂ emissions that would have been generated by a conventional power plant of this size.

c. Land Fill Gas Recovery and Utilization

The county is in the process of using landfill gas generated by the closed I-66 Sanitary Landfill as a fuel source to heat county buildings on the West Ox Campus. In particular, the new Department of Vehicle Services Maintenance Garage has radiant heaters that can be easily converted to burn landfill gas, as was done for the truck wash at the I-66 Transfer Station and for the maintenance shop at the I-95 Landfill. In 2005, the county began the Phase 1 planning and design for the project. Construction of the necessary infrastructure to use LFG from the I-66 complex (closed landfill) as a source of renewable energy to heat the buildings mentioned above is being accomplished in Phase 2, which is to be completed in 2008. The total project cost is approximately \$300,000, and will provide estimated annual savings of \$70,000 per year in reduced natural gas consumption. The LFG pipeline would run approximately 2,500 feet from the existing flare station to the garage, requiring 4" high density polyethylene pipe to transmit the gas. Approximately 150-200 standard cubic feet per minute of LFG will be required to heat the garage. In addition, LFG is used at I-95 to generate six MW of electricity which is sold to Dominion Energy, and also as the fuel for sludge processing at Noman M. Cole, Jr. Wastewater Treatment Plant.

4. Green Vehicle Solutions

a. Hybrid Vehicle Replacement Program

The county's vehicle fleet currently has 104 hybrid vehicles: 55 Toyota Priuses and 49 Ford Escape hybrids. The county plans to continue its hybrid vehicle replacement program in 2008 at a reduced pace due to budget constraints. Over the last three years, the fuel savings from the use of hybrids amounted to 37,460 gallons of unleaded gas, which equates to a savings of 363 tons of CO₂ emissions. In 2006, the county converted one of its Priuses to a "plug-in-hybrid-electric" vehicle. This car travels up to 30 miles on electric power from the grid before engine-generated electrical power is used. It achieves fuel efficiency on some trips of over 100 miles per gallon of gas, plus grid electricity at an equivalent cost of about 75 cents

per gallon of regular gas as compared to over \$3.50 per gallon of regular gas for a similar non-hybrid vehicle. The county is also pursuing grant funds to complete projects for a plug-in-hybrid-electric school bus and a hybrid delivery truck. We expect that the school bus would achieve a 40 percent decrease in diesel fuel consumption and the truck a 25 percent decrease with corresponding decreases in greenhouse gas emissions.

b. Diesel Exhaust Retrofits

The county has retrofitted 1,012 school buses, 167 Connector buses, and 113 heavy duty trucks with exhaust after-treatments that reduce particulate emissions. The bus retrofits include 436 school buses and 57 Connector buses with treatments that also reduce nitrogen oxides (a precursor to the formation of smog). These retrofits also indirectly benefit greenhouse gas reduction. In addition, Fairfax County Public Schools purchased 147 school buses with the reduced emissions engine control.

c. Idle shutoff and horsepower reduction

All county solid waste trucks and all Fairfax Connector buses have automatic idle shutdown programmed into their engine controls. In addition, the engines on 25 Connector buses have been de-rated by 25 horsepower to reduce fuel consumption and corresponding emissions of regulated pollutants and greenhouse gases by five percent for affected buses.

B. NATIONAL RECOGNITION FOR COUNTY EFFORTS

Fairfax County has received national recognition for many of its efforts, including the following:

- In 2008, the county received the 2007-2008 PTI Technology Solutions Award for Sustainability from the Public Technology Institute for its Plug-In Hybrid Vehicle Fleet Trial.
- In 2007, the county was recognized as a Green Power Partner by the U.S. Environmental Protection Agency for efforts to reduce the risk of climate change through green power purchasing.
- In 2007, the county joined the U.S. Environmental Protection Agency's ENERGY STAR[®] Challenge program.
- In 2006, the county received a National Association of Counties Achievement Award for Environmental Excellence for the Board of Supervisors' Environmental Agenda ("A 20-Year Vision") and for the Environmental Improvement Program.

- In 2006, Fairfax County was first among large counties in the National Association of Counties Change a Light Campaign, a two-month nationwide campaign challenging county employees to change incandescent bulbs with compact florescent bulbs.
- In 2005, the county received recognition as the U.S. Environmental Protection Agency Landfill Methane Outreach Program Community Partner of the Year Award for use of landfill gas as a renewable energy source, saving the county \$5,000 a year in fuel.
- In 2005, the county received a National Association of Counties Achievement Award for “Improving Air Quality in the Washington Metropolitan Region, a Commitment to Air Quality Excellence - Air Quality Protection Strategy”.

C. COMMENT

1. According to a presentation given at the June 11, 2007 Board of Supervisors’ Environmental Committee meeting, the Facilities Management Department cost avoidance since 2001 for electricity is well over \$3 million with part-time efforts. For example, one energy project performed by part-time efforts of one staff resulted in a cost avoidance of approximately \$83,000 annually at the Government Center (variable frequency drives, lighting retrofits and lighting software upgrades).

EQAC commends the county for its past efforts and looks forward to working with the county in the future on its climate change program.

D. RECOMMENDATION

1. In 2007 EQAC recommended that the county hire an Energy Coordinator who will coordinate efforts among a number of county agencies to build coordinated, cross-agency efforts to enhance energy conservation and efficiency. The position would also provide an initial point of focus to support implementation of energy conservation practices in the county. A Countywide Energy Coordinator would serve as a central conduit of information to and from agencies and the community to better understand and leverage energy conservation practices employed, and lessons learned. This position would act as the county’s expert on all matters pertaining to energy efficiency and renewable energy and work closely and collaboratively with the Environmental Coordinator and other agencies as required. At the direction of the Board of Supervisors, the County Executive included within the fiscal year 2009 advertised budget the Energy Coordinator position. In April 2008 the Board of

Supervisors adopted the fiscal year 2009 budget with the Energy Coordinator position authorized in the budget. The position was to be established through the abolishment of a vacant assistant to the County Executive position. In May 2008, the Human Resources department recommended that the grade for the position be established as an S-30. The position is in the process of being incorporated and established within the County. EQAC continues to support the hiring of an Energy Coordinator for Fairfax County.