2015 ANNUAL REPORT ON THE ENVIRONMENT

CHAPTER I

CLIMATE CHANGE AND ENERGY

I. CLIMATE CHANGE AND ENERGY

A. BACKGROUND

Climate change/global warming is the result of world-wide emissions of greenhouse gases (GHGs), including carbon dioxide. Because the rise in GHG concentrations is attributed to the combustion of fossil fuels, many local governments across the United States are working to improve energy efficiency and reduce GHG emissions[1]. This chapter outlines work that is under way in Fairfax County to reduce GHG emissions and improve energy efficiency.

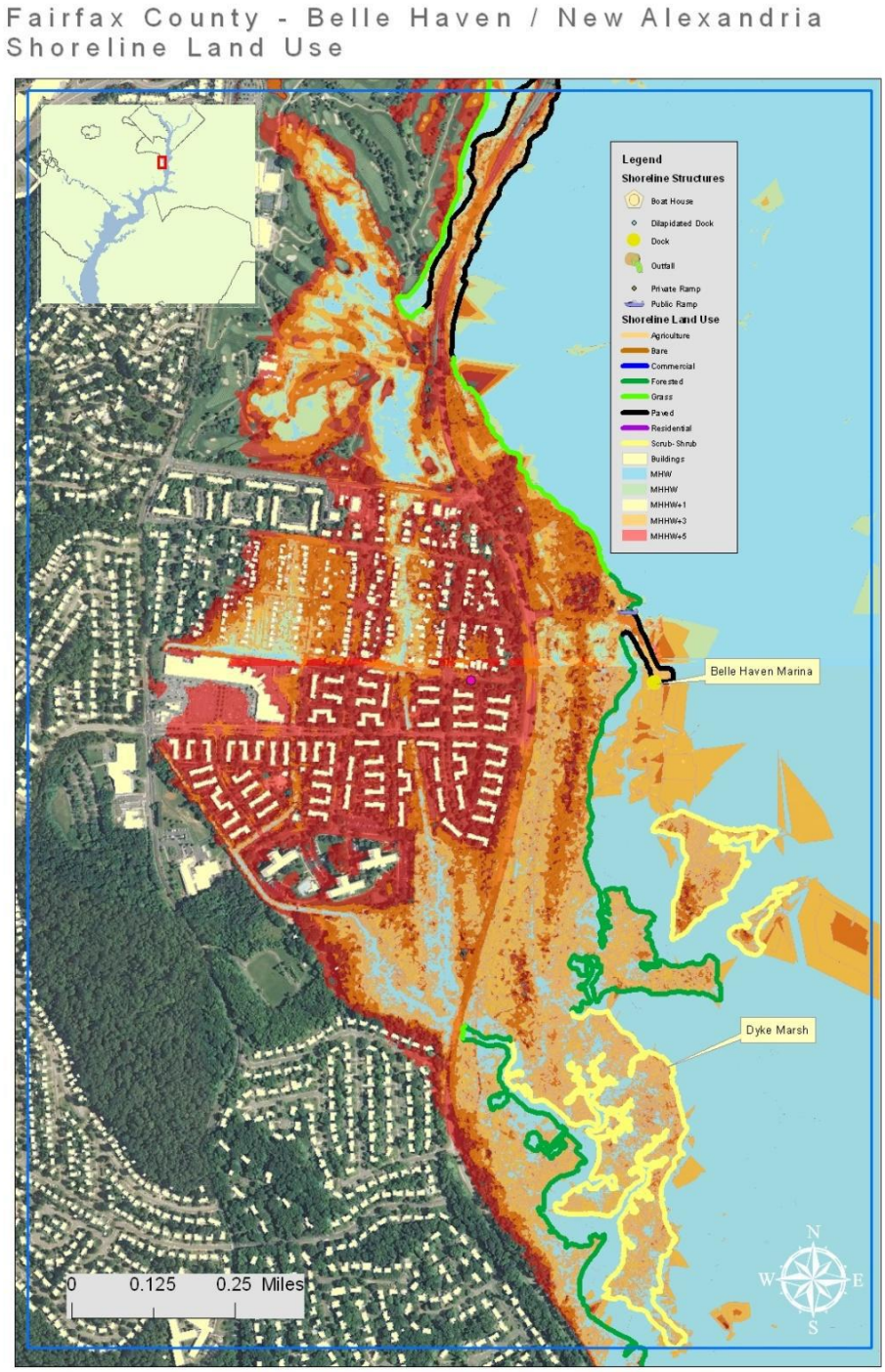
Climate change is already impacting the United States. Recent evidence shows that climate change is worsening the California drought because the higher temperatures are hastening evaporation in an area that is already stressed for water.[2] The governments of many countries and scientists worldwide acknowledge a real concern for the impacts of climate change.

Is climate change a threat to Fairfax County? In recent years, Fairfax County has seen warmer temperatures and more poison ivy, which has been attributed to slightly warmer temperatures. Floodplain boundaries in the county have been redrawn to meet Federal Emergency Management Agency floodplain designations, resulting in more home structures now being located in floodplains. The Governor's Commission on Climate Change[3] estimated that there will be a sea level rise of between one and 1.6 feet by 2050 and between 2.3 and 5.2 feet by the year 2100. Similar impacts are being predicted elsewhere in the United States and around the world. The average carbon dioxide level, which results from the combustion of fossil fuels and contributes to global warming, has risen to over 400 parts per million (ppm).

Because climate change will have a range of impacts, including rising sea levels and changes in species that can inhabit an area, a number of counties and states have developed and are developing plans to mitigate the impact of climate change. These plans address a variety of issues from health impacts to minimizing property damage due to rising sea levels. While Fairfax County has taken steps to evaluate some impacts such as a rise in sea level, there has not been an effort to examine all impacts of climate change on Fairfax County and outline measures that can or should be taken to mitigate these impacts.

The Northern Virginia Regional Commission has prepared several reports to characterize the impact of climate change on sea level rise on Northern Virginia communities. Fairfax County would be impacted in a number of areas but especially in the Belle Haven/New Alexandria area as shown in Figure I-1.[4] However, other communities near coastal areas in Virginia and elsewhere face similar risks and many have programs designed to mitigate the impacts of rises in

Figure I-1: Belle Haven/New Alexandria Inundation Scenarios, Northern Virginia Regional Commission



Source: Northern Virginia Regional Commission, Sustainable Shorelines and Community Management in Northern Virginia, Phase III, September 30, 2013

sea level. Mitigation could involve levies, berms and changes in land use. The identification of vulnerable areas and proactive steps to mitigate impacts is important to reducing the risk of flooding as a result of sea level rise. Coastal states and communities in the United States are taking steps to plan and prepare for sea level rise to minimize impacts.

The 2008 National Capital Region Climate Change Report[1] provides some excellent background information on climate change in the metropolitan Washington, D.C. area. The report[1] highlights many important considerations, including:

- Temperatures are rising along with both sea level and atmospheric carbon dioxide levels.
- As population continues to increase in the Washington, D.C. area, emissions of GHG are also projected to increase.
- A variety of actions have been proposed in the report to reduce GHG emissions; these recommendations have formed the basis for bringing together local governments from the Washington, D.C. area to take action to reduce GHG emissions.

According to the Pew Center on Global Climate Change,[5] the United States has five percent of the world's population yet we contribute 17 percent of the world's GHG emissions. Moreover, U.S. emissions have accounted for 30 percent of the world's GHG emissions since 1850. Given the observed increases in GHG concentrations in the atmosphere, the increases in temperature, melting of the glaciers and rises in sea level, the world is moving towards controlling GHG emissions.[2]

In summer 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 seven percent below their 1990 levels by 2012. Chairman Gerald E. Connolly and other members of the Fairfax County Board of Supervisors decided 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.[6]

Solving climate change is a daunting task by any measure, but Fairfax County continues to play a leadership role in this effort. The county plays an active and

significant role in regional cooperation and influence on major environmental policy and operations like air quality, land use planning and zoning, transportation, forest conservation, solid waste management and recycling and water conservation. Fairfax County leads by example by: adjusting Fairfax County operations to understand both GHG emissions and energy use; adopting programs to improve energy efficiency and reduce GHG emissions; and looking at county operations to assess what policy or program changes we have the authority and resources to enact in order to lower the emissions produced by county operations.

To guide efforts to address energy, Chairman Sharon Bulova created the Chairman's Private Sector Energy Task Force to bring together prominent members of the Fairfax County development and business communities as well as academia to create a new energy strategy for the county and lead in the area of energy efficiency, sustainability and "green" technology. The task force brought together the private sector, utilities, schools, government officials, organizations including the Environmental Quality Advisory Council and county staff. At this point, it appears that the work of the Task Force has come to an end. The work of the Private Sector Energy Task Force was intended to help Fairfax County position itself as a leader in the area of energy efficiency, sustainability and "green" technology. The Private Sector Energy Task Force was a good beginning, but the development of an energy strategy remains important to Fairfax County. As an example, EQAC recommends that Fairfax County place a priority on supporting education and recognition for companies that adopt energy efficient approaches as part of their business practices. By achieving a reduction of energy use for Fairfax County businesses of all sizes, projects that improve energy efficiency and reduce the need for energy will give companies a clear return on their investments, not only through lowered costs but also through enhanced reliability and security and increased competitiveness in the region and in the country.

Fairfax County has undertaken new efforts to make sustainability a core element of county operations. Making decisions that will be sustainable for the county and provide for sound environmental practices is important to the future of Fairfax County. Much of the progress in this area is summarized on the county's webpage dedicated to the environment and sustainability.[7]

An energy strategy will also attract green collar jobs to Fairfax County. This will be achieved by fostering a business community that these industries find attractive; one that is committed, across all sectors, to achieving ambitious energy efficiency goals. More information is available in the report of the Task Force.[8]

Climate change is a very active area for the region and it is impressive the way that most local governments are undertaking efforts to address it. This chapter reviews efforts that Fairfax County is taking and provides some information on regional efforts as well as the efforts of nearby counties.

While district energy has proven efficiency and is being used in a variety of areas, even around the Washington, D.C. metropolitan area, Virginia laws complicate the question of district energy and whether and how energy can be sold back into the grid. This point can adversely affect the economics of such projects so that they would not be profitable in Virginia when they would be viable in the District of Columbia or Maryland. Fairfax County has been active in working with other Virginia jurisdictions to evaluate district energy. Moreover, the use of district energy is easier to implement when a single owner is responsible for multiple buildings, as is the case in Crystal City (part of Arlington County). Moreover, there are issues with obtaining credit for the return of excess energy back into the grid resulting from the way that Virginia law is written. Fairfax County is an active participant with this and other issues at a regional level and is undertaking efforts to provide answers that will allow Fairfax County and other Northern Virginia jurisdictions to move forward on this and other issues in the future.

Another example involves efforts to obtain a "carbon footprint" (i.e., the GHG emissions associated with the consumption of fossil fuels and other activities that release GHG emissions). Briefings to EQAC from county and Fairfax County Public Schools staffs have reported significant energy savings in a variety of county facilities, including schools that are renovated. While Fairfax County government has undertaken work to characterize the carbon footprint for government buildings, similar building-specific efforts evaluating the performance of individual non-government buildings have not been expanded to the residential and commercial sectors. There are a number of issues associated with such work, some of which might be solved by reporting from utilities. Again, Fairfax County is working with other jurisdictions to explore options for obtaining and managing this information. This chapter focuses on three areas: (1) activities that Fairfax County government is undertaking to reduce GHG emissions associated with county operations; (2) efforts that Fairfax County is taking to network with the greater Washington metropolitan region in these efforts; and (3) Fairfax County's GHG emissions and activities that the county is taking to reduce such emissions from residences and business operations.

During 2015, Fairfax County published *Sustainability Initiatives: FY 2015*. The Sustainability Initiatives report outlines a vision for sustainability that reflects the consideration of climate change and energy consumption. It also highlights the process that the county undertakes to fund projects selected as part of the Environmental Improvement Program that have the potential to save money and provide for environmental improvements. While projects funded as initiatives have an up-front capital cost, they have often shown that they can pay for themselves over a few years through cost savings.

B. FAIRFAX COUNTY GHG EMISSIONS INVENTORY

In April 2013, the county completed its GHG emission inventory.[9] This was the first comprehensive attempt to evaluate the GHG emissions for Fairfax County. While this was the first comprehensive inventory of GHGs for the county, differences in methodologies by the various local governments made it difficult to either compare or combine the inventories from different governments in the Washington D.C. area. As a result, the Metropolitan Washington Council of Governments, with the support of the Northern Virginia Regional Commission, is undertaking an inventory all of GHG emissions in the region using a consistent methodology that is widely used nationwide. While aggregate results for the region have been prepared, Fairfax specific results are not yet available. When the results are available, this annual report on the environment will be updated.

The 2013 Fairfax County GHG emissions inventory employed the following practices:

- Only property that was under the jurisdiction of Fairfax County was included. Thus, the federal government properties located within the county, including but not limited to Fort Belvoir, Dulles Airport, the Central Intelligence Agency and the National Reconnaissance Organization, were not included. In addition, independent political subdivisions such as the City of Falls Church and the City of Fairfax were excluded from the analysis.

- The analysis includes scope 1 (all direct GHG emissions) and scope 2 (indirect GHG emissions) emissions. Scope 3 emissions associated with the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity related activities not covered in Scope 2, outsourced activities, waste disposal and other GHG emissions are mentioned but excluded from the analysis.[8,9]

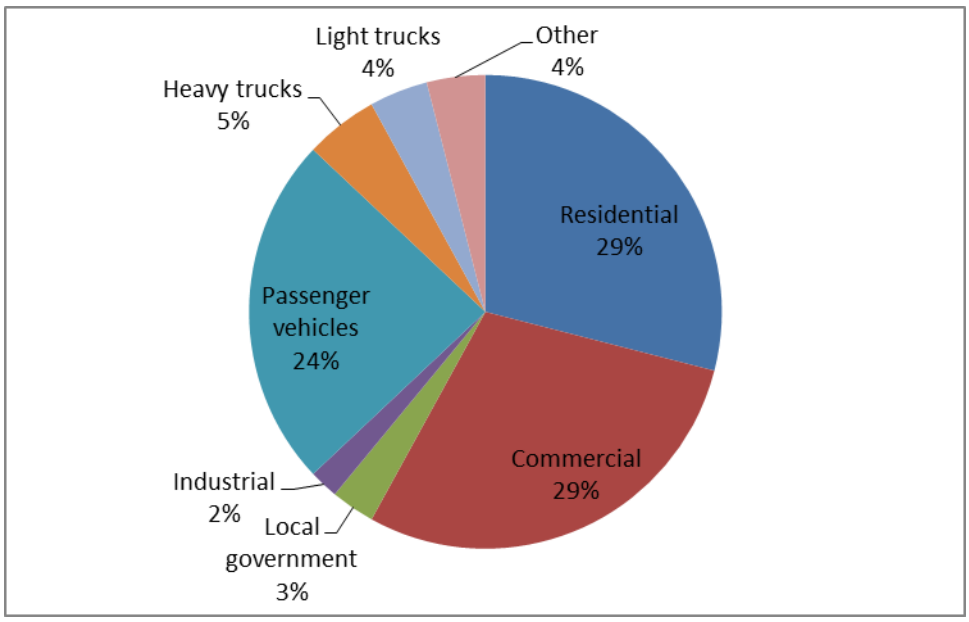
Both of the above assumptions, though reasonable, should be examined when comparing the Fairfax County emissions of 11.4 metric tons CO_2 equivalent ($MTCO_2e$) per capita across local jurisdictions because of the differences in methodologies for the GHG inventory. For example, Arlington County's estimate of over 13 metric tons per capita includes emissions from National Airport, although Arlington County exerts no control over the airport.

While Fairfax County has been working with the Metropolitan Washington Council of Governments to develop a comprehensive regional GHG inventory, the Fairfax County specific results are not yet available. Consequently, this section summarizes results from the 2006 countywide emissions inventory. When the Fairfax County results are available, they will be incorporated into this report.

Figure I-2 shows that the main sources of GHG emissions are electricity generation (both residential and commercial) and mobile sources. The annual GHG emission

per average Fairfax County resident is about 11.4 $MTCO_2e$. Information from the county's GHG emissions inventory, which includes a base year of 2006 with four additional years of data, shows that this number had decreased slightly in 2010, which could be attributable to a combination of factors, including education and outreach efforts to reduce energy consumption. According to the Pew Center on Global Climate Change, the average U.S. citizen has an annual average GHG emission of over 20 $MTCO_2e$, over twice the world average.[5] However, the lower estimate of GHG emissions per person reported in this inventory has a much sounder basis than the gross estimate from the Pew Center. There are valid reasons that the Fairfax County per capita GHG emissions could be higher or lower. For example, the mix of vehicles in the Washington, D.C. area is newer than in many other areas, the Washington, D.C. area has mass transit to serve the population and much of the building stock of Fairfax County is newer and more energy efficient than buildings in other areas. However, the Washington metropolitan region does suffer from some of the nation's worst traffic, which would raise GHG emissions. Moreover, the estimate of GHG emissions for Fairfax County does not include Scope 3 emissions, which we expect is consistent with the GHG inventories of many, if not most, local governments.

Figure I-2. 2006 Countywide GHG Emissions (11.838 $MMTCO_2e$)



Source: *Community Greenhouse Gas Inventory for Fairfax County, Virginia, Report of Findings: 2006-2010*, Fairfax County, Virginia[9] (advance copy).

While Figure I-2 groups GHG emissions into a few groups of emission sources, there are many different sources of GHG emissions and many opportunities for reducing GHG emissions. For example, most waste in the Washington, D.C. area is incinerated, which is preferred to landfill disposal of waste because landfills generate methane (which is 20 times more potent than carbon dioxide as a GHG).

Recently, however, some property managers of buildings in Arlington County, the District of Columbia and parts of Maryland adopted a more comprehensive recycling program, which is being offered by a private company. One of the reasons that this program for waste management is being selected is that the cost is similar to the cost of incineration and ash disposal. Materials recycled include the materials that most waste companies offer (i.e., glass, aluminum, newspaper) as well as other materials that include batteries, plastic bags and any material that can be composted (i.e., food waste, soiled paper towels and other materials). In addition to providing for a more comprehensive recycling program, the composting of food waste and other materials decreases waste. Composting of waste is far more desirable because it reduces the generation of GHG when compared with landfilling waste. Moreover, because composting of waste provides a useful product, as opposed to ash from an incinerator that must be managed into the future, composting of food and other materials that can be composted has merits that warrant further consideration, as about 30 percent of this material will remain as ash after incineration.

C. ACTIVITIES THAT FAIRFAX COUNTY RESIDENTS CAN UNDERTAKE TO REDUCE GHG EMISSIONS

The Fairfax County GHG inventory serves as a guide for both actions that EQAC feels are fundamental to any GHG emissions reduction effort (e.g., monitoring energy use in government buildings and undertaking renovations to be energy efficient) and other actions. Some efforts, such as saving energy, reducing vehicle miles, carpooling or maybe riding a bike to work will involve changes in lifestyle that can be better for the planet while providing good exercise. Key opportunities for GHG emissions reductions include:

- Reduce home energy demands. Much of the electrical use shown in Figure I-2 serves to power, heat and cool buildings. Insulation, energy efficient windows, solar panels, geothermal energy and wind power can all help to reduce GHG emissions from building operations. As the use of renewable energy sources increases, the availability and cost of these sources will hopefully decrease.

- Reduce the use of single occupancy vehicles by carpooling, using mass transit, bicycling, walking or pursuing other alternatives (including work at home opportunities). Vehicle emissions constitute another significant source of GHG emissions, so this is another area that seems to be an appropriate target for reduction.

- Participate in local efforts to plan for improved land use patterns and to encourage energy efficient construction practices. Participating in these local efforts will also help to ensure that energy efficient construction practices will have a better chance of acceptance and success.

D. FAIRFAX COUNTY OPERATIONS GHG EMISSIONS AND ACTIONS TO REDUCE THESE EMISSIONS

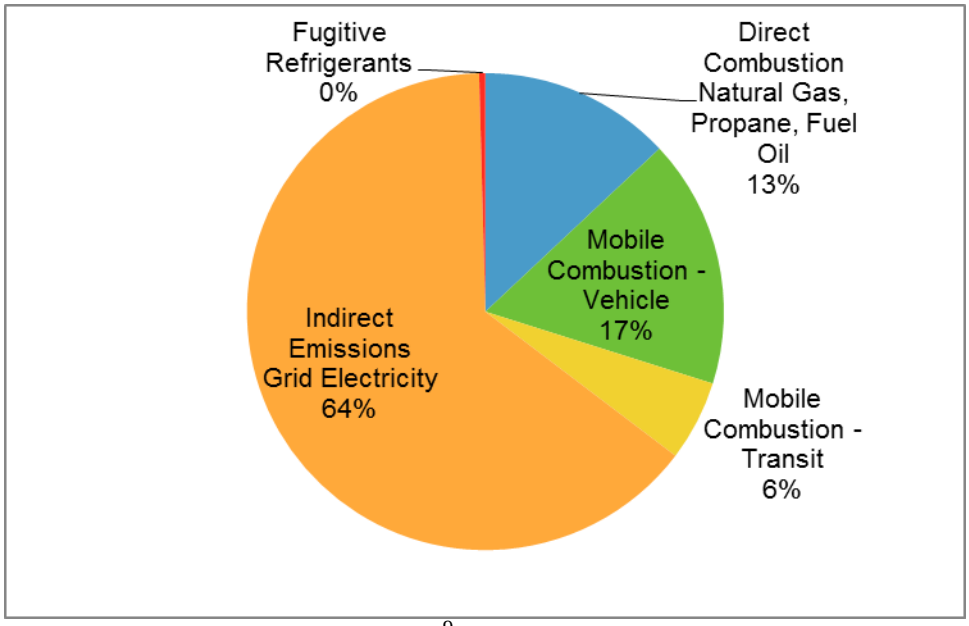
1. Overview

The Fairfax County government has undertaken extensive efforts to both characterize GHG emissions associated with county operations and to target opportunities for increased energy efficiency. While county savings from these efforts are to be commended, the success of the Fairfax County government in characterizing emissions and improving the efficiency of operations serves as a model for both businesses and residents in the county.

Fairfax County has already taken a number of significant actions, such as purchasing hybrid vehicles, promoting green energy efficient buildings, promoting renewable sources of energy and teleworking, to name just a few.

Fairfax County has had a hybrid vehicle replacement program since 2002 and currently has 112 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 from the grid before engine-generated electric power is used; on some trips, it has a fuel efficiency over 100 miles per gallon of gas (plus grid electricity). Subsequently, the county purchased five plug-in hybrid electric Chevrolet Volts.

Figure I-3. 2010 Fairfax County Government Emissions by Source Type (460,695 $MTCO_2e$)



Source: Fairfax County, Virginia.[9]

Fairfax County is using renewable energy technology to harness energy. This includes landfill gas-to-energy systems at both closed landfills and solar mixers at the Noman M. Cole Jr. Pollution Control Plant.[10]

Telework is another effective tool for reducing our GHG 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.

2. Facilities Management

A decade ago, the county's Facilities Management Department (FMD) set an internal goal of a one percent annual reduction in energy use per square foot (kBTU/square foot) for the buildings in its inventory. Because annual savings are cumulative, reductions of over 10 percent in energy usage per square foot are expected over a 10-year period. Recent numbers show FMD achieving or exceeding this goal, despite a substantial increase in square footage. During the period FY 2001 – FY 2010, FMD's energy reduction efforts resulted in a cost avoidance of more than $7 million. The magnitude of the energy savings is illustrated by kilowatt hours avoided. In 2005, FMD's actions saved 4,232,639 kWh; an additional 2,398,036 kWh were saved in 2006. Additionally, during these same years, natural gas consumption was reduced by 111,440 therms per year. FMD took a wide range of actions to achieve these savings, including: the installation of energy management control systems; right-sizing heating, ventilating and air conditioning equipment; and installing efficient lighting and lighting controls.

3. Vehicle Services

In response to the county's need for cleaner and more energy-efficient vehicles, the Department of Vehicle Services (DVS) began to include hybrid-electric vehicles in its vehicle replacement program, where appropriate. As a result, a conventional gasoline-fueled county fleet vehicle at the end of its service life may be replaced with a hybrid vehicle, if requested by the agency and conditions warrant. The county's fleet includes 117 hybrid-electric and plug-in hybrid-electric vehicles. The county saves over 16,000 gallons of gas each year from its use of hybrid vehicles.

The county operates other non-conventional vehicles, including a hybrid-electric school bus. DVS has undertaken a diesel exhaust retrofit project, in which it retrofitted 1,012 school buses, 167 Connector buses and 113 heavy duty trucks with exhaust after-treatments that reduce particulate emissions. Other innovative energy-saving DVS activities include programming automatic

idle shutdown into all county solid waste trucks and all Fairfax Connector buses and de-rating the engines on 25 Connector buses by 25 horsepower to reduce fuel consumption and corresponding emissions by five percent for affected buses.

DVS continues to seek grant funding for further exploration of hybrid and electric drive vehicles. As other prototype or early production vehicles become available, DVS will consider whether to conduct demonstrations with those vehicles as well.

More information is available at the Fairfax County website on sustainability.[7]

4. Green Buildings

In early 2008, the Board of Supervisors adopted the Sustainable Development Policy for Capital Projects applicable to the construction of new county buildings and renovations or additions to existing buildings. The policy provides a framework for preserving and promoting the natural environment, conserving energy, meeting or exceeding air and water quality standards, creating healthy work environments and establishing a community standard for sustainable practices. Under this policy, county projects greater than 10,000 square feet in size are expected to achieve a minimum LEED® Silver certification.[7] Smaller facilities are expected to achieve LEED certification. As of July 2015, the county had a total of 36 green building projects, 17 of which attained certification (15 under the LEED program and two under the Green Globes program). The other 19 projects, all of which have a goal of LEED Silver, are in design or are under construction. In addition, the county managed the LEED Gold Virginia Department of Transportation Administration Building. The county continues to investigate and implement sustainable practices in both new and renovation projects.[7] Green roofs were installed at both the Great Falls Volunteer Fire Station and the Dolley Madison Library. An extensive rainwater collection system and cistern storage was implemented at the Newington Department of Vehicle Services facility for use by the vehicle bus wash. Lighting controls systems and both interior and exterior LED lighting have been specified on a number of projects. The majority of the projects include construction waste management plans that are executed by the construction contractor. Capital Facilities has also partnered with the Department of Public Works and Environmental Services-Stormwater Planning to implement water quality enhancement measures (e.g., low impact development stormwater management practices) on projects to exceed the regulatory requirements. Practices include porous asphalt, pavers and concrete; bioretention/infiltration facilities; cisterns; gravel galleries; and compost soil amendments.

5. Parks

The Fairfax County Park Authority, which has its own energy management policy, is committed to programmatically addressing energy management and has begun coordinating energy management initiatives and conservation throughout the over 400 parks, nine recreation centers, seven golf courses and other facilities that it manages. It has embarked on an energy-saving retrofit replacement program at its RECenters, nature and visitor centers, buildings, tennis courts and athletic fields to reap long-term, system-wide environmental and cost benefits. Key aspects of that program include lighting retrofits (e.g., the installation of T8 Lamps and electronic ballasts, LED exit signs, occupancy sensors and compact florescent lamps), motor replacements (e.g., replacing 20 horsepower or larger motors with high-efficiency units) and control installations (Web-based wireless control of key mechanical systems that allows automatic run-time scheduling, phased start-up to avoid peak demand utility penalty charges and remote access). The Park Authority's first major energy project was completed at the Providence RECenter in 2008. Energy use declined 60 percent in those areas receiving new lighting, including the pool area, and overall facility electricity costs declined 20 percent, which translates to a three-year payback for the project. As an added bonus, pool customers prefer the new lighting.

Some of the upgrade/retrofit energy projects that were completed in 2014 are:

- Lee District spray park variable frequency drive (VFD) installation for the main pump.
- Oak Marr VFD installation for the main pool pump.
- Providence RECenter natatorium lighting upgrade.
- Nottoway tennis courts (1 and 2) lighting upgrade.

6. Waste Management

The Department of Public Works and Environmental Services (DPWES) has also undertaken innovative energy saving measures to achieve energy savings in many of its industrial plant processes. For example, the Noman M. Cole, Jr. Pollution Control Plant uses methane gas from a county landfill in its sludge-burning process, thereby avoiding the purchase of natural gas and recovering a gas that has a global warming potential that is 21 times that of carbon dioxide. DPWES is using solar energy equipment to power nine remote wastewater flow-monitoring sites and to assist in treating wastewater; its use of solar mixers at the treatment plant is saving about $40,000 a year in energy costs. DPWES is also undertaking a water reuse project to use 560 million and 24 million gallons of reclaimed water from the plant for process and irrigation purposes, respectively. This project avoids the energy use and costs associated with treating the water. Also under way is a project to provide the Energy/Resource Recovery Facility (E/RRF) with approximately two million gallons of potable

water for process purposes. This project will reduce consumption of potable water at the E/RRF through the reuse of wastewater treatment plant effluent as a substitute. This action will provide both facilities with cost savings of up to 25 percent per year over the cost of potable water. More information is available at www.fairfaxcounty.gov/dpwes/wastewater/noman_cole.htm and www.fairfaxcounty.gov/dpwes/construction/water_reuse/.

7. Transportation

The county contributes funding for the operations of the Washington Metropolitan Area Transit Authority. In addition, the county's Department of Transportation (DOT) has a number of initiatives supporting transit use in Fairfax County. The Employer Services Program provides outreach to employers on transportation demand management strategies, including rideshare incentives and promotions, computerized ride matching, carpool incentives such as preferred parking, subsidies and telework programs. Other DOT efforts include the Connector Bus system, the "RideSources" program, which provides ridesharing information and ride matching assistance to commuters (part of the regional Commuter Connections system), the Community Residential Program, which assists residential communities with the assessment and promotion of alternatives to single occupant vehicle trips and the provision of park-and-ride lots. Employees are eligible to receive a subsidy for transit use of up to $120 per county employee. Also, in 2012, DOT initiated efforts for the conversion of the maintenance and service buildings at West Ox Road for their use of landfill gas for heating. More information is available at www.fairfaxcounty.gov/fcdot/.

The county's Transportation Demand Management program is designed to reduce the number of cars on the road. The program includes a variety of common sense components including ridesharing, guaranteed ride home, transit incentives, non-single occupancy vehicle parking and other components (see: www.fairfaxcounty.gov/fcdot/tdm.htm). Progress in achieving the goals of this program should be tracked to see how effective they are in achieving the program goals.

8. Schools

Fairfax County Public Schools comprise a significant part of the county's facilities. School renovations have provided an excellent opportunity to improve the energy efficiency of school building operations. Teachers also promote energy efficiency, which not only improves energy use but also provides an important part of student education on reducing the emissions of greenhouse gases and energy efficiency. The Get to Green program, which is a national program promoted within Fairfax County, promotes environmental awareness for students and faculty alike.

9. Reporting of Greenhouse Gases

Fairfax County has made significant strides in collecting information on energy use at county facilities. This information has been used to help the county understand areas of high energy use and target opportunities for reducing energy use. One of the suggestions to help reduce energy use is to make energy use more visible through real time reporting or some summary of recent energy use. This information has been of interest to communities and has allowed counties and organizations to identify areas for potential energy savings and to demonstrate that energy savings can be realized. In response to public comment and EQAC interest, county staff has briefed the EQAC on progress that the county is making towards improved reporting, including development of an energy dashboard. The most recent update from county staff was in June.

E. EDUCATION AND OUTREACH

Climate change is a phenomenon that can have real impacts on our lives, and yet the effects of local actions are more limited than those associated with other environmental problems. Counties across the U.S. are taking steps to reduce GHG emissions and inform people who live and work in these counties. To address this challenge, Fairfax County is exploring the use of social media to facilitate communications and education on climate change. One of the most significant actions that Fairfax County has taken is the establishment of an outreach program to assist Fairfax County residents in understanding the benefits of efforts to improve home energy efficiency, which also reduces GHG emissions.

In late 2011, following an open bidding process, the county selected a vendor to assist in the development and branding of a federally-funded residential energy education and outreach program and to work closely with the county's project management team (PMT) overseeing the effort. EQAC supported this outreach effort through participation on the PMT.

Working collaboratively throughout the first three quarters of 2012, the vendor and PMT developed the Energy Action Fairfax pilot program[11] to provide ways for residents to learn about their energy consumption and how to reduce it through improved energy efficiency. Given the limited time horizon, the program was narrowly focused and aimed at homeowners in Fairfax County, particularly those occupying single-family homes and townhouses. The program's direct outreach included presentations at homeowner association meetings, small energy-audit gatherings within selected communities and the distribution of informative brochures at events and fairs. The program also generated stories for local media and created a multi-faceted presence on the county website (www.fairfaxcounty.gov/energyactionfairfax/) that includes tips sheets, checklists and short how-to videos. [11]

In its 2012 and 2013 Annual Reports, EQAC commended this effort and recommended the continuation of energy education and outreach through a follow-on program. Staff is building on the pilot Energy Action Fairfax with a second phase that both retains a residential component and also develops and implements a green business recognition program. The residential component includes a restructured and revised Web presence and continuing free presentations to homeowner associations and community groups. The green business recognition program will be a free program open to businesses of all types and sizes that are integrating sustainability principles like energy conservation, waste reduction and water conservation into their day-to-day operations. Participating businesses will be listed in a green business directory on a "green business" Web page on the county's website and will receive window decals or other means of advertising their designation as a Fairfax County green business designation. Both the residential and business efforts anticipate direct outreach, community events and continuing updates to their respective webpages.

F. REGIONAL COORDINATION

1. Climate, Energy and Environment Policy Committee

Fairfax County is well-recognized for its participation in regional environmental and energy initiatives. One such initiative is the Climate, Energy and Environment Policy Committee (CEEPC). CEEPC was created in 2009 by the Metropolitan Washington Council of Governments' Board of Directors to provide leadership on climate change, energy, green building, alternative fuels, solid waste and recycling issues and to help support area governments as they work together to meet the goals outlined in the National Capital Region Climate Change Report.[1]

CEEPC includes representatives from COG's 22 member governments, state environmental, energy and transportation agencies, state legislatures, the Air and Climate Public Advisory Committee, federal and regional agencies, electric and gas utilities, environmental organizations, business organizations and members of the academic community.

a. Climate and Energy Action Plan

In May 2013, CEEPC adopted its 2013-2016 Climate and Energy Action Plan.[12] The new plan places a greater emphasis on energy efficiency and climate resiliency, and includes recommendations for local governments on: greenhouse gas inventories and reduction plans; built environment and infrastructure; renewable energy; transportation and land use; sustainability and resiliency; and public outreach.

Figure I-4 summarizes recent local government efforts to address the local measures included as key priorities in the 2013-2016 Action Plan. This figure helps to illustrate the breadth of activities local jurisdictions in the Washington, D.C. area are undertaking to address climate change and the progress the region has already made. As one of the largest local governments, Fairfax County is not only active but plays a leadership role in many activities related to climate change.

To track the region's progress toward the CEEPC Action Plan goals, COG Department of Environmental Programs staff performs an annual Climate and Energy survey of local member governments and water utilities and evaluates the results in the annual Progress Report.[13]

In 2013, CEEPC, working with the members of the Air and Climate Public Advisory Committee, created a Climate and Energy Awards Program. The awards program will recognize projects, programs or policy initiatives that help achieve the regional goals identified in the Climate, Energy and Environment Policy Committee's 2013-2016 Climate and Energy Action Plan. In 2015, awards will be given in each of the following categories: small and medium communities (population under 100,000); large communities (population over 100K); nonprofit organizations; and private businesses. Awards will be given based on results achieved, creativity, stakeholder engagement and transferability to other jurisdictions. Recipients will be announced in fall 2015. Details are on the COG website.

b. ENERGY STAR® Portfolio Manager Regional Data Sharing

In May 2014, COG held an ENERGY STAR Portfolio Manager Regional Data Sharing Training for local governments and schools in the region that wish to connect and share their building data with COG and each other. Sharing this data will allow COG to better track regional Climate, Energy and Environment Policy Action Plan goals, such as energy and water use and GHG emission reductions. It will also allow local governments to compare their facilities' energy performance with similar property types on a region-wide basis.

c. Advocacy

In 2014, CEEPC advocated for a number of climate and energy issues in the Virginia General Assembly, including strengthening the state renewable energy portfolio standard, removing financial disincentives for solar energy and expanding low-cost financing for energy efficiency and renewable energy projects through Property Assessed Clean Energy (PACE) financing. CEEPC also made recommendations to the Department of Mines, Minerals and Energy on the 2014 Virginia Energy Plan.

Figure I-4. Select Local Measure Highlights (At least 50 percent of local governments are implementing or in progress on each measure listed in the following chart.)

Local Government	2010 Census Population[1]	Govt GHG Inventory	Community GHG Inventory	Govt GHG Reduction Plan	Comprehensive Energy Strategy	Green Building Policy	Efficient Street Light Program	Govt Energy Benchmark	Green Purchasing Policies	Green Fleet Policy	Commuter Options Program	Tree Canopy Plan
District of Columbia	601,723	■	■	□	□	■	□	■	□	□	■	□
Suburban Maryland												
Fredrick County	233,385	■	■	■	■	□			○	□	■	□
City of Frederick[2]	65,239	○	○	○	○	○	NR	NR	■	○	○	□
Montgomery County	971,777	■	■	■	□	■	□	■	■	N/A	■	N/A
City of Gaithersburg[2]	59,333	□	○	○	■	■	□	○	○	○	○	□
City of Rockville[2]	61,209	□	□	■		■	■	■	□	□	■	■
City of Takoma Park[2]	16,715	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Prince George's County	863,420	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
City of Bowie2	54,727	■	○	○	■	■	□	□	○	□	○	□
City of College Park[2]	30,413	■	□	○	○	N/A	■	○	□	N/A	■	□
City of Greenbelt[2]	23,068	□	□	□	□		N/A	□	○	■	○	□
Town of Bladensburg[2]	9,148	○	○	○	○	○	○	□	□	□	□	□

Local Government	2010 Census Population[1]	Govt GHG Inventory	Community GHG Inventory	Govt GHG Reduction Plan	Comprehensive Energy Strategy	Green Building Policy	Efficient Street Light Program	Govt Energy Benchmark	Green Purchasing Policies	Green Fleet Policy	Commuter Options Program	Tree Canopy Plan
Northern Virginia												
Arlington County	207,627	■	■	□	□	■	□	■	■	■	■	■
Fairfax County	1,081,726	■	□	■	□	■	□	□	■	■	■	■
Loudon County	312,311	■	■	■	■	■	○	■	■	■	■	□
Prince William County	402,002	□	○	□	□	□	○	■	□	□	■	□
City of Alexandria	139,966	■	■	■	■	■	□	□	□	□	■	■
City of Fairfax	22,565	○	○	□	□	■	□	□	○	□	○	□
City of Falls Church	12,332	■	■	□	□	○	□	□	■	■	□	□
City of Manassas	37,821	○	○	○	□	○	□	□	N/A	■	N/A	■
City of Manassas Park	14,273	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

■-Implemented □-In progress ○-Not Started N/A-Not Applicable NR-No response

[1] Source: COG tabulation of Census 2010 PL 94-171 Redistricting Data

[2] Population in Maryland cities is included in appropriate county totals.

Source: Metropolitan Washington Council of Governments, 2011, *Climate, Energy and Environment Policy Committee Regional Climate and Energy Action Workplan 2010 Progress Report*, with an update from Amanda Campbell, June 27, 2014[14]

d. Energy and Greenhouse Gas Reporting

COG Climate and Energy staff collected and analyzed annual energy consumption data from regional utilities, which will be used to measure progress on reducing greenhouse gas emissions from the 2005 baseline. An initial analysis shows that the region has met its goal of reducing greenhouse gas emissions back to 2005 levels by 2012. The data are also used to inform COG's progress report on regional air, climate and energy initiatives, and to assist local governments in their own energy and climate programs and reporting, such as grant and award applications.

In 2014 staff collected electricity and natural gas data for the 2013 calendar year. Since 2005, the region's overall electricity consumption has grown 2.3 percent and natural gas consumption has fallen nine percent. Fairfax County's electricity consumption has grown eight percent and natural gas consumption has fallen 19 percent. The region's installed net-metered solar capacity more than doubled between 2012 and 2013, to 28 megawatts. Net metered solar capacity in Fairfax County increased 28 percent between 2012 and 2013 to 116 kW.

e. Built Environment and Energy Advisory Committee

The Built Environment and Energy Advisory Committee (BEEAC) serves as a technical advisory committee to the Climate, Energy and Environment Policy Committee. Membership includes local government energy managers and government staff supporting green building initiatives as well as interested stakeholders. The group serves as a forum for discussion and monitoring of energy and green building issues in the Washington, D.C. metropolitan area. Environmental, energy and land use and planning staff from Fairfax County actively participate in BEEAC.

In 2014 and 2015 BEEAC primarily focused on three areas:

1. Development of BEEAC By-laws.
2. Regional Solar Permitting Guidelines.
3. Establishing the PACE Financing Work Group Subcommittee.

BEEAC updated its bylaws in 2015 to formally establish the committee's role as a technical advisory committee to the Climate, Energy and Environment Policy Committee. The updated bylaws also expanded the committee's purpose to cover issues related to green buildings, the built environment and renewable energy. Noel Kaplan, Senior Environmental Planner in the Fairfax County Department of Planning and Zoning, provided valuable feedback throughout the committee input process.

The new bylaws also outlined BEEAC's support of Emergency Support Function (ESF) 12 under the National Response Framework. The BEEAC

ESF-12 subcommittee is responsible for coordinating with state and local agencies and emergency response teams to maintain continuous and reliable energy supplies through preventive measures, restoration and recovery actions. The ESF-12 subcommittee sponsored a three-workshop series that has led to recommendations to improve the region's ability to respond to a long-term energy supply disruption. Garrick Augustus, Energy Coordinator for Fairfax County, actively participates in the BEEAC ESF-12 subcommittee.

f. Electric Vehicle Working Group

COG's electric vehicle (EV) initiatives began in early 2011, leading to the creation of a stakeholder-driven task force whose mission was to develop regional and local program and policy recommendations that would facilitate adoption of electric vehicles. Kambiz Agazi, Fairfax County Environmental Coordinator, served as task force co-chair. Subgroups addressed comprehensive planning, zoning, building codes and permitting/inspection, infrastructure siting, energy utility policy and outreach and education.

Task Force stakeholders included electric vehicle owners, state and local government staff (transportation and energy planners), electric vehicle original equipment manufacturers, electric vehicle supply equipment suppliers, nonprofit organizations (e.g., Georgetown Climate Center, Electric Drive Transportation Association, Electric Vehicle Association of Greater Washington D.C.), the Greater Washington Regional Clean Cities Coalition and electric utility representatives from the region.

In 2012, the Task Force produced the report, "Electric Vehicles in Metropolitan Washington" (www.mwcog.org/store/item.asp?PUBLICATION_ID=449). [15] The report provides a comprehensive look at current regional EV readiness and offers recommendations to address barriers to EV use. The report also stresses the benefits of EVs, including reducing greenhouse gases, improving air quality and dramatic fuel costs savings.

The top five recommendations from "Electric Vehicles in Metropolitan Washington" to encourage greater EV use in metropolitan Washington are:

1. A Washington Regional Electric Vehicle Partnership should be formed to develop a business case for EVs and to assess the potential for community return on investment.

2. Consider offering incentives such as preferred parking, high occupancy vehicle (HOV) occupancy exceptions and tax credits to promote EV adoption.

3. Electric permitting procedures should identify EV charging station installations and notify electric utilities of their locations.

4. Outreach and education is needed to promote EV adoption and inform the public of its benefits.

5. Local government comprehensive plans and zoning regulations should guide EV infrastructure development and ensure that the built environment can accommodate future EV charging station installations.

The 2014 and 2015 EV work program years focused on three key areas: supporting the eight state zero-emission vehicle (ZEV) program memorandum of understanding (MOU); developing and conducting the COG-vision fleet pilot assessment; and promoting work place charging.

The ZEV MOU is an agreement that was signed in October 2013 by the governors of eight states, including Maryland, to adopt or consider adopting regulations requiring increasing sales of zero-emission vehicles. To promote regional collaboration, COG partnered with the Maryland Electric Vehicle Infrastructure Council to conduct a Regional EV Readiness Workshop. The purpose of the workshop is to promote shared standards and region-wide EV infrastructure development. Noel Kaplan, Senior Environmental Planner with the Fairfax County Department of Planning and Zoning, highlighted the county Planning Commission's Environment Committee review process and electric vehicle charging infrastructure recommendations prepared by the MITRE Corporation.

g. Climate Adaptation

The Metropolitan Washington Council of Governments, working with the U.S. Environmental Protection Agency (EPA) and National Oceanographic and Atmospheric Administration (NOAA) through the Smart Growth Implementation Assistance Program, has developed a guidebook for adapting to risks from climate change in four sectors: land use; transportation; buildings; and water.[16]

During the process to develop the guidebook, stakeholders identified the need for more specific information about climate trends, anticipated impacts and planning implications in the Washington, D.C. metropolitan area. To address this need, COG developed its *Summary of Potential Climate Change Impacts, Vulnerabilities, and Adaptation Strategies in the Metropolitan Washington Region.*[17] This summary is a synopsis of lessons learned from MWCOG's climate adaptation planning initiatives from 2010-2012.

COG has led teams of local climate leaders attending several Institute for Sustainable Communities climate leadership academies. Kambiz Agazi, Fairfax County Environmental Coordinator, participated in the October

2014 Sustainable Communities Leadership Academy entitled "Think Resiliently; Act Regionally" held in Alexandria, Virginia (www.sustainablecommunitiesleadershipacademy.org/workshops/act-regionally).

COG continues to monitor and present the latest findings from sources such as the International Panel on Climate Change and the National Climate Assessment to aid decision makers. See COG's Climate Impacts and Adaptation website for additional resources and activities (www.mwcog.org/environment/climate/adaptation.asp), including a handout on climate projections for the region developed by the National Aeronautics and Space Administration (NASA).[18]

h. Sustainable Purchasing

On January 29, 2015, COG held a Green Purchasing Vendors' Fair. More than 120 representatives from local governments (including Fairfax County) school systems and utilities joined over 30 vendors representing a wide variety of environmentally friendly products and services. In addition to showcasing these green products and services, expert panels and speakers discussed "greening" the supply chain and contract language as well as creating healthy buildings through procurement choices.

The fair was a collaborative effort between COG and the Baltimore Metropolitan Council, (through the Mid-Atlantic Purchasing Team) and the Montgomery County Green Business Certification Program.[19]

i. Rooftop Solar Challenge

COG has been continuing its work under the U.S. Department of Energy (DOE) SunShot Initiative Rooftop Solar Challenge II to reduce the soft costs of solar photovoltaic (PV) deployment. Eleven COG members, including Fairfax County, are participating in the project, which focuses on streamlining the permitting and inspections process, removing zoning barriers and expanding access to solar PV through financing or bulk purchasing programs.

Through the Rooftop Solar Challenge II, Fairfax County has access to free technical assistance from two teams of consultants through DOE, and the resources developed by two national Rooftop Solar Challenge II teams of which COG is a member, to assist the county in meeting its solar market development goals. Fairfax County's progress can be tracked on the Solar Roadmap website (http://my.solarroadmap.com/ahj/fairfax-county-va/view). This project runs through April 2016.[20]

j. Regional Solar Permitting Recommendations

In 2014, COG worked with the Maryland/DC/and Virginia Solar Energy Industries Association and BEEAC members to develop the Regional Recommendations for Residential Solar PV Systems to support the consistent application of solar PV permitting and inspection best practices across the region. Adopting and implementing best practices for solar permitting and inspections will ensure that systems are installed and operated safely, reliably and efficiently, while reducing the paperwork burden for permitting and inspections staff. Regional consistency will further reduce the costs currently incurred by property owners and solar companies across the region.

This effort will also help municipalities and states meet their renewable energy and climate change goals. In addition, it will foster regional economic and job growth by helping local solar companies expand their businesses. The recommendations, including template permitting and inspections checklists and a model expedited permit process, are available on the COG website, at www.mwcog.org/uploads/committee-documents/YF1WV1dc20150603162429.pdf.

k. Solarize Initiative

Solar bulk purchasing initiatives (called solarize programs or solar-co-ops) help reduce customer acquisition costs for solar installations and reduce the cost of going solar for the community by leveraging bulk purchasing power. Under the Rooftop Solar Challenge II project, a team led by Community Power Network (CPN) is supporting local governments in education and outreach activities to accompany the launch of solarize programs or solar-co-ops in their communities.

Northern Virginia Regional Commission (NVRC) and Local Energy Alliance Program (LEAP), who are part of the CPN team, recently launched the second round of Solarize NoVA. This program is focusing on Herndon and Vienna in Fairfax County, the City of Falls Church and Loudoun County. CPN is also supporting residential solar co-ops in Bowie, Maryland, Rockville, Maryland and Arlington, Virginia.

l. PACE Financing Workgroup

In early 2015, CEEPC voted to establish a regional workgroup to provide guidance to COG members on developing Property Assessed Clean Energy financing programs and to encourage growth of the PACE market regionally. The PACE workgroup will also encourage consistency in PACE programs across the region to improve the growth and success of PACE

financing in all jurisdictions. As the technical advisory committee to CEEPC, BEEAC will advise the workgroup.

By leveraging public taxing authority to bring in private capital, PACE financing can reduce or eliminate up-front project costs, offer transferability upon sale and enable low monthly payments by providing financing terms up to 15-20 years. Because of these advantages, PACE financing can be an important tool for achieving significant greenhouse gas reductions though building energy efficiency and renewable energy improvements. Washington, D.C. has an operational PACE program for commercial buildings, and several jurisdictions in the region intend to soon implement programs.

Implementing PACE would require local governments to establish new processes to manage payments on PACE loans as part of property tax payments. Payments on PACE loans would have priority lien status similar to that of property tax payments. Implementation would require careful consideration by localities to ensure a PACE program could be successfully implemented within the locality's property tax system. This will be a key component of the regional PACE workgroup.

2. Northern Virginia Regional Commission

The nonprofit Local Energy Alliance Program, in partnership with the Northern Virginia Regional Commission, operates the Home Performance with ENERGY STAR (HPwES) program to help improve the energy efficiency of existing homes in northern and central Virginia. LEAP educates communities on energy efficiency and facilitates and tracks energy improvement work done by a network of vetted local contractors. Homeowners can have their homes certified HPwES if they make efficiency improvements measuring 20 percent or more. LEAP is headquartered in Charlottesville, Virginia and expanded to Northern Virginia in 2012.

In October 2013, LEAP introduced the Home Energy Check-Up as an entry service offering to the HPwES program; this has proven to be a very effective way to get the energy conversation started with homeowners and to get energy plans for their houses. The Home Energy Check-Up is a one hour visual inspection done by a LEAP professional building analyst who provides an evaluation of the homes' efficiency potential, advice on cost effective improvements and a few immediate installed saving measures based on the home's needs such as energy efficient light bulbs and smart power strips. The value of the check-up is estimated at over $250 in goods, savings and professional advice. LEAP is able to offer the low price of $45 to the homeowners as a participating contractor in the Dominion Virginia Power Home Energy Check-Up Program. For those homeowners interested in making improvements through the HPwES program after the check-up, LEAP is then

available to assist with technical advice throughout the improvement process, whether that is all at once or staged over time.

As of June 30, LEAP has performed 723 Home Energy Check-Ups in northern Virginia, of which 392 were in Fairfax County. 137 homes in Northern Virginia have been certified in the Home Performance with ENERGY STAR program to date, of which 20 were in Fairfax County.

Re-Energize Reston Community Challenge

LEAP engages local communities with outreach; this is done in partnership with local municipalities, civic associations, congregations and other community groups. Campaigns in Fairfax County have ranged from neighborhood efforts in Wilton Woods in Alexandria and Long Branch in Annandale to a broader community effort in Reston. In partnership with Reston Association and in celebration of Reston's 50th anniversary of its founding year (1964), LEAP launched the Re-Energize Reston Community Challenge with the goal of helping 1,964 homeowners get a Home Energy Check-Up. To engage the community, the effort is also serving as a fundraiser for Friends of Reston, which will earn $10 for each Home Energy Check-Up done in the challenge. Friends of Reston is a nonprofit organization that provides environmental education programs at its flagship Walker Nature Center in Reston.

3. NOVA Parks (Northern Virginia Regional Park Authority)

Three Northern Virginia counties (Fairfax, Loudoun and Arlington) and three cities (Alexandria, Fairfax and Falls Church) participate in NOVA Parks (the Northern Virginia Regional Park Authority). NOVA Parks was founded in 1959 and currently operates 31 regional parks on 12,031 acres of land that it owns and leases throughout the region. It also holds conservation easements on 115 parcels covering more than 655 acres.

Since 2005, NOVA Parks has adopted energy conservation plans for each park and has tracked its carbon footprint. Using the accounting system, instead of just recording utility costs, NOVA Parks also tracked units of consumption for all fuels. The NOVA Parks facility in Fairfax County with the most significant energy reduction in 2014 was Pohick Bay Regional Park, with consumption down 12.2 percent. This was achieved by implementing easily attainable items like efficient lighting and insulation to improve the energy consumption of existing buildings; using a wide range of technologies like geothermal heat pumps, electric and hybrid vehicles, programmable thermostats and green building elements that improve efficiency; and having a policy that considers the life cycle costs of the energy-consuming systems.

In November and December 2014, Meadowlark Botanical Gardens hosted a walking holiday light show using all LED lights that use only a 10th of the

electricity normal incandescent bulbs use. NOVA Parks partnered with Dominion Virginia Power to educate the public about energy conservation for both all-LED holiday light shows at Bull Run Regional Park and Meadowlark Botanical Gardens.

G. SMART GROWTH (see also the Land Use and Transportation chapter of this report)

1. Transit-Oriented Mixed-Use Development

Key planning concepts in Fairfax County include the protection of stable, residential neighborhoods from incompatible development and the concentration of new growth in mixed-use growth centers, largely focused around transit opportunities and revitalization areas. Transit-oriented development (TOD) should serve to reduce, in aggregate, the number of motor vehicle trips and vehicle miles traveled and the associated emissions that would otherwise occur through more traditional suburban development patterns in the region. An increasing focus on TOD over the last 20 years led to the 2007 adoption of a Comprehensive Plan definition for TOD and development guidelines, with a strong emphasis on vehicle trip reduction and pedestrian and non-motorized transportation. Major recent initiatives include: adoption of the Plan for Tysons Corner; adoption of Plan Amendments supporting TOD in the Franconia-Springfield Area, Baileys Crossroads, Annandale, Seven Corners, Lake Anne Village Center, the Fairfax Center Area, areas near Fort Belvoir and areas near future rail stations in the Reston and Herndon areas; and the adoption of new zoning districts to facilitate the establishment of mixed use, transit-oriented development in growth centers.[21]

2. Transforming Tysons

On June 22, 2010, the Board of Supervisors adopted a Comprehensive Plan amendment for Tysons Corner that will turn the area into the county's "downtown." The plan focuses future growth within an easy walking distance of transit. Fairfax County expects that 75 percent of future growth will be within a half mile of the four Metrorail stations. Many offices and homes will be a three to six minute walk from these stations, allowing people to get around on foot, bicycle, bus or subway. The plan, which was creating based on economic, transportation and fiscal analyses,[22] guides growth during the next 20 years while creating a framework for redevelopment beyond 2030. It sets an initial development level of 45 million square feet for office space, which is the highest market forecast for the year 2030. Once this amount of office development is reached, the plan would be updated to allow for additional growth. The plan also encourages mixed use development by allowing residential, hotel and ground floor retail at levels above the 2030 forecast. The

plan also provides for the use of district energy--allowing use of energy near the point of generation, which provides opportunities for much greater efficiencies in the use of energy generated.

The Comprehensive Plan amendment establishes the expectation of substantial commitments to energy and water conservation measures for development proposals, especially where rezonings are being sought. As substantial redevelopment is expected in the Tysons area, the plan for Tysons Corner should lead to redevelopment that is more energy and water efficient. More information is available at www.fairfaxcounty.gov/dpz/tysonscorner/.

3. Green Building Policy and the County's Comprehensive Plan

In December 2007, the Board of Supervisors adopted an amendment to the Policy Plan volume of the county's Comprehensive Plan that established a green building policy. The policy included broad support for green building practices and established linkages between the incorporation of green building/energy conservation practices and the attainment of certain Comprehensive Plan options, planned uses and 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 were recommended 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 were recommended for any other residential development proposed at the high end of the Plan density range.

The aforementioned Policy Plan amendment was adopted with the expectation that it would be reviewed in two years. The Planning Commission's Environment Committee began its review of this policy in November 2009; this review resulted in the completion, in July 2011, of a "strawman" draft Plan amendment that was released for public review and comment. The committee's review of all comments received on this draft was completed in fall 2012, and a Planning Commission recommendation for a Policy Plan amendment was transmitted to the Board of Supervisors in December 2012 in the form of a second "strawman" draft. In July 2013, the board authorized, through the Fairfax Forward program, a Plan amendment consistent with this second strawman draft.

The Planning Commission held a public hearing on May 7, 2014 and recommended approval of a proposed Plan amendment on June 12, 2014. The Planning Commission recommended several changes to the policy, including:

- Clarifying that the emphasis of the policy has always been on individual buildings, not site/neighborhood design.
- Adding support for reuse of and for greening/retrofitting existing buildings.
- Adding language to encourage energy and water usage data collection and performance monitoring, as well as participation in regional and local evaluations of outcomes.
- Adding language to encourage the use of natural lighting.
- Adding support for solid waste and recycling management practices.
- Defining "equivalent" in reference to green building rating systems.
- Removing a limitation on a green building expectation for multifamily residential proposals relating to number of stories, as rating system eligibility requirements have changed.
- Adding support for higher levels of green building performance when proposed developments have relatively high levels of intensity or density (both residential and non-residential).
- Updating the range of residential green building rating systems available for use, recognizing the more comprehensive systems now available, and revising the related policy to focus more holistically on green building design and not just ENERGY STAR qualification.
- Adding Industrial Areas to the areas of the county with an expectation for a green building commitment.
- Clarifying expectations for public-private partnerships.
- Adding support for infrastructure for electric vehicle charging.

On July 1, 2014, the Board of Supervisors adopted the Plan amendment as recommended by the Planning Commission.

While a green building policy is expected to encourage more energy efficient practices, it is important to recognize that there are a number of companies that already seek to adopt energy efficient policies. For example, a Costco that was recently built is applying for LEED certification. This Costco, like others, incorporates many energy efficient features in it construction and operations. Other chains, like Whole Foods, are also sensitive to energy efficiency and recycling.

4. MITRE Studies

Electric Vehicle Charging Infrastructure

In August 2011, the MITRE Corporation, per a proffered commitment to sustainability-related work for the benefit of Fairfax County, completed a report titled "Electric Vehicle Charging Infrastructure Recommendations to Fairfax County." The report included several recommendations, with a particular focus on electric vehicle charging-related opportunities associated with redevelopment in Tysons Corner. The MITRE report was transmitted to the Board of

Supervisors, which, in turn, referred the report to the Planning Commission for its review and recommendation.

The Planning Commission's Environment Committee has recently completed its review of the MITRE report and its recommendations. During the several meetings that the committee held on this issue, the committee received presentations from: the MITRE Corporation; the Fairfax County Environmental Coordinator (regarding related efforts at the regional level); and three private sector providers of electric vehicle supply equipment. The committee developed a series of policy questions for consideration based on these discussions. The list of policy questions was circulated to stakeholders for comment, and the revised policy questions were then considered by the committee. A draft white paper was prepared that provided: an overview of the review process; background information regarding electric vehicle charging; comprehensive plan guidance as it relates to this issue; guidelines and requirements of other jurisdictions; and draft recommendations on each of the policy questions. The draft white paper was circulated to stakeholders in April 2014 and was discussed at a workshop in May 2014. The Environment Committee has completed its review and is forwarding its recommendations to the full Planning Commission for its consideration.

Building Energy Technology

Also per MITRE's proffer commitment, MITRE conducted research for the county focusing on flexible building design to accommodate energy efficiency innovations – that is, ways to design buildings now to allow for the future implementation of innovative energy systems that may not be cost effective or otherwise feasible at the present time. The report also provided guidance regarding renewable energy supplies and their potential applicability for new buildings and building retrofits. MITRE's report was transmitted to the Board of Supervisors in May 2013 and has been referred to the Planning Commission for review and recommendation. The Planning Commission's Environment Committee began its review of this report in February 2014.

Presentations have been provided by: the MITRE Corporation; the Fairfax County Department of Cable and Consumer Services (regarding the district energy concept); the Fairfax County Department of Facilities Management (regarding the county's building energy monitoring efforts) and the U.S. Environmental Protection Agency (regarding EPA's Portfolio Manager tool). At the committee's request, staff prepared a document and provided a briefing on its perspectives on the recommendations provided by the MITRE Corporation. The MITRE report and staff perspectives document were posted to the committee's website and a notice was sent to stakeholders seeking comments on these documents. The committee has since been discussing the comments that were received as well as issues relating to building energy monitoring. The committee's review is continuing.

5. Lorton Green Energy Triangle

The Lorton area is also undergoing significant growth and development. In 2011, a white paper was developed by an energy industry engineer serving on the board of the Lorton Arts Foundation. The paper describes efforts that could be explored beyond the efforts that are already being pursued (see the next section of this chapter and the Solid Waste chapter) in conjunction with waste management facilities in the Lorton area. For example, landfill gas could be used in the Lorton Workhouse Art Center, waste heat from the waste to energy facility in Lorton could be used to power major commercial activities and landfills could house a variety of renewable energy technologies (e.g., wind, solar). The planning for the Lorton Green Energy Triangle has involved a number of parties, including the Department of Public Works and Environmental Services. This effort has been recognized by the Chairman's Private Energy Sector Task Force.

These cooperative planning efforts, and efforts to make more efficient use of existing energy sources and to create renewable energy within the county, are commendable.

H. WASTE MANAGEMENT AND ENERGY EFFICIENCY

1. Waste-to-Energy

The county's Energy/Resource Recovery Facility recovers methane, controls nitrous oxide and generates about 80 megawatts of electricity from solid waste – enough energy to power about 75,000 homes and the facility itself. The sale of this electricity to the local utility generates revenues that partially offset the facility's operational cost. Converting waste to energy at the E/RRF provides a number of benefits in addition to these revenues. Incineration avoids the need to landfill garbage and the resulting production of methane, which traps 21 times more heat per molecule than CO_2 and nitrous oxide, which absorbs 310 times more heat. In addition, waste-to-energy avoids the combustion of coal, oil or gas to produce electricity. The county's Department of Public Works and Environmental Services estimates that the waste-to-energy plant avoids the equivalent of approximately one million tons of greenhouse gas emissions each year.[23]

2. Landfill Gas Recovery and Utilization

There are both closed and open portions of the I-95 landfill, with the open portion collecting ash generated by the Energy/Resource Recovery Facility. The county collects landfill gas generated by the closed portion of the I-95 landfill (which collected solid waste) and the closed I-66 landfill as a substitute

for fossil fuel to heat on-site buildings. It has installed a system to use landfill gas from the closed I-66 landfill as a fuel source to heat vehicle maintenance facilities at its West Ox campus, at an initial project cost of approximately $300,000. With annual natural gas savings of between $40,000 and $50,000, the estimated payback for the West Ox LFG project is less than eight years. A second system at the Bus Operations Garage has been installed and is now operational. At the I-95 landfill, LFG recovered from a well field is delivered to a series of power stations that produce up to six megawatts of electricity, which is sold to the local utility and is then distributed to homes. This can power about 75,000 homes and saves approximately two million barrels of oil a year. The county's LFG projects reduce its carbon dioxide emissions by more than 300,000 tons each year.[7]

I. AWARDS AND RECOGNITION

Climate Action Champions

In December 2014, the U.S. Department of Energy selected the National Capital Region as one of 16 national "Climate Action Champions" under a program launched by the White House to recognize local and regional efforts to reduce greenhouse gas emissions and enhance climate resilience. Officials lauded COG and its member governments for the National Capital Region Climate Change Report, which they said demonstrates "a fully integrated approach to climate change mitigation." As Climate Action Champions, COG and its members, including Fairfax County, will be eligible for future targeted federal financial and technical assistance to help those communities further raise their ambitions.

J. COMMENTS

1. The Facilities Management Department cost avoidance from fiscal year 2001 to fiscal year 2010 is in excess of $7 million, or an average annual energy reduction of one percent. For example, one energy project performed by part-time efforts of one staff member resulted in a cost avoidance of approximately $83,000 annually at the Government Center complex (variable frequency drives, lighting retrofits and lighting software upgrades). More could be accomplished with dedicated staffing. EQAC commends the county for its past efforts and looks forward to working with the county in the future on its climate change program. Continued support for the funding of projects through the county's Environmental Improvement Program will be important to continue to support progress in identifying new efficiencies in energy use.

2. EQAC commends the county for assembling an inventory of greenhouse gas emissions for Fairfax County facilities and for designing a GHG reporting program

for the county that allows for GHG emissions to be easily combined with reporting of other jurisdictions.

3. EQAC commends the county for recognizing the importance of reducing the community's GHG emissions and for soliciting bids for a countywide education and outreach program that would cut GHG emissions. It is EQAC's view that this effort has been productive, and EQAC encourages the county to continue this work.

4. EQAC commends the county for participation in regional efforts to reduce GHG emissions and improve energy efficiency. Certain GHG programs, such as transportation related programs, district energy and reporting of carbon footprints require intergovernmental cooperation.

5. EQAC commends Fairfax County for the work that has taken place to support residential education and outreach. This is a good beginning but it will need continued support. The residential sector is a big part of Fairfax County and there are potential significant efficiencies to be realized by the county. This should continue to be an area of emphasis.

K. RECOMMENDATIONS

1. EQAC recommends that the county establish a program to evaluate and address the impacts of sea level rise. Last year, EQAC recommended that the county undertake an effort to identify all the impacts of climate change that might reasonably be expected to impact the county. County staff replied with a comprehensive list of such impacts, along with the climate drivers associated with each of the impacts (i.e., temperature changes, precipitation variability, severe storms and sea level rise). EQAC recommends that Fairfax County place sea level rise as a priority among the various impacts so that the impacts of sea level rise would be further evaluated and addressed through a program that would be dedicated to the reduction of impacts of sea level rise through proactive planning efforts, as other jurisdictions have done. An example of a possible outcome of this effort would be a consideration of land use policy changes that may be appropriate to address existing and potential future land uses within areas in Fairfax County that would be vulnerable to sea level rise.

2. While Fairfax County has made significant strides in monitoring energy use, identifying opportunities for reducing energy use and reporting this information to the county government, the county has not yet completed and published an online energy dashboard as discussed at a meeting of the Board of Supervisors' Environmental Committee earlier in 2015. Just as this information has been useful to the county, it would also be helpful for businesses and residents to see the benefits of monitoring energy use as well as the significant savings that the county has realized. EQAC understands that a website similar to websites in Arlington, Los Angeles and other cities is affordable and would likely more than pay for itself

as energy savings opportunities are identified and addressed. In June 2015, county staff provided EQAC with an update to its Environmental Committee presentation, and EQAC understands that a refined approach to the establishment of an online energy dashboard is getting under way. EQAC recommends that this effort be completed.

3. While EQAC appreciates the efforts of Fairfax County to reengage the private sector on energy efficiency, sustainability and ”green” technology, the work of the Private Sector Energy Task Force to help Fairfax County position itself as a leader in the area of energy efficiency, sustainability and “green” technology stopped years ago. The Private Sector Energy Task Force was a good beginning, but the work recommended by the task force is languishing and needs to be reinvigorated. More specifically, EQAC recommends that the county facilitate meetings of the private sector so that private sector entities can be acknowledged for their energy efficiency accomplishments in Fairfax County and so that steps can be taken to encourage and facilitate continued dialogue among private sector entities. We are hoping that Fairfax County will have private sector discussions on energy efficiency and acknowledge accomplishments like Arlington and other nearby jurisdictions have done.

4. While the county staff is pursuing opportunities with a composting facility in Prince William County and the county’s Solid Waste Management Plan clearly identifies recycling as preferable over incineration and landfilling, EQAC continues to recommend that the Board of Supervisors direct county staff to evaluate alternatives for the county to further reduce greenhouse gas emissions from the incineration of waste. It is unclear if facilities in nearby counties will accommodate additional waste streams from Fairfax County. The long-term goal should provide for expanding the recycling of all waste streams, including composting of compostable waste. The expansion of waste streams recycled should be considered as the county develops a strategic plan for the management of county waste. Specific recommendations related to the support of recycling are included in the Solid Waste chapter.

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