PORTRAITS OF PROGRESS

Climate and Energy Action in Metropolitan Washington

December 2015

Metropolitan Washington
Council of Governments

ABOUT COG

The Metropolitan Washington Council of Governments (COG) is an independent, nonprofit association that brings area leaders together to address major regional issues in the District of Columbia, suburban Maryland and Northern Virginia. COG's membership is comprised of 300 elected officials from 22 local governments, the Maryland and Virginia state legislatures, and U.S. Congress.

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Cover Photos (Left to Right): Arlington Initiative to Rethink Energy (AIRE), COG, GRID Alternatives, American University

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PORTRAITS OF PROGRESS

Climate and Energy Progress Report

Prepared by the Climate, Energy, and Environment Policy Committee
for the COG Board of Directors

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MESSAGE FROM THE CHAIRMAN

ROGER BERLINER
CEEPC Chairman

This past year, the Climate, Energy, and Environment Committee (CEEPC) celebrated five years of collaboration, partnerships, and progress. Established in November 2009 by the COG Board of Directors, CEEPC is the largest policy body at COG with the most diverse set of stakeholders having a seat at the table. They are a group of passionate leaders, taking action in their local communities and working together to make a big regional impact.

This report, *Portraits of Progress*, spotlights many of the cutting edge local activities taking place that earned metropolitan Washington recognition as a White House Climate Action Champion, and play a key role in helping the region meet its next goal—reducing greenhouse gas (GHG) emissions 20 percent by 2020.

As Chair of CEEPC, I would like to thank our committee members and partners for their leadership and dedication to their local communities and the region as a whole. Let's continue on our path as Climate Action Champions, working diligently together toward our 2020 goal.

INTRODUCTION

About the Climate, Energy, and Environment Policy Committee (CEEPC)

The Climate, Energy, and Environment Policy Committee (CEEPC) provides leadership on climate change, energy, green building, alternative fuels, solid waste, and recycling. CEEPC is made up of representatives from COG's 22 member governments, state, regional, and federal agencies, electric and gas utilities, environmental and business organizations, academic community, and technical and public advisory leadership. CEEPC, along with its Built Environment and Energy Advisory Committee (BE-EAC) and Air and Climate Public Advisory Committee (ACPAC), worked to meet the region's GHG emission reduction goals of 10 percent below business as usual projections by 2012 (back down to 2005 levels), with a continued focus on reduction goals of 20 percent below 2005 levels by 2020 and 80 percent below 2005 levels by 2050 as outlined in the *2008 National Capital Region (NCR) Climate Change Report.* CEEPC works toward these goals through an aggressive set of short term goals and actions in the *Climate and Energy Action Plan.*

CEEPC Members

BEEAC Members

ACPAC Members

Portraits of Progress

CEEPC members have adopted high standards and stretch goals as part of the regional Climate and Energy Action Plan. Members implement innovative environmental policies and projects in their local communities that can continue to be scaled up into regional solutions. Through the work of CEEPC and its members, there have been several notable accomplishments over the past five years:

- The region met its 2012 goal of 10 percent reduction in greenhouse gas (GHG) emissions below business as usual projections, bringing regional emissions back down to 2005 levels.
- CEEPC has already met and surpassed its 2016 goal of 5,000 grid-connected renewable energy systems operating in the region with more than 7,300 systems.
- ENERGY STAR has nationally recognized Washington, D.C and the Metropolitan Statistical Area (MSA) for having the highest number of energy efficient buildings in 2015.
- The US Clean Tech Leadership Index ranked the metro area in the top five regions for clean-tech activities.

The accomplishments of CEEPC and its members have also earned the region recognition as a White House Climate Action Champion. This designation makes COG and its members eligible for enhanced technical assistance and grant funding.

This report highlights many of the cutting edge local activities taking place that will help the region meet its next goal of 20 percent reduction in GHG emissions by 2020. Advances in net zero energy, zero waste, and zero-emission vehicles are underway as are initiatives that continue to enhance the regional clean energy economy through engagement and support of action by businesses and citizens.

GREENHOUSE GAS EMISSIONS

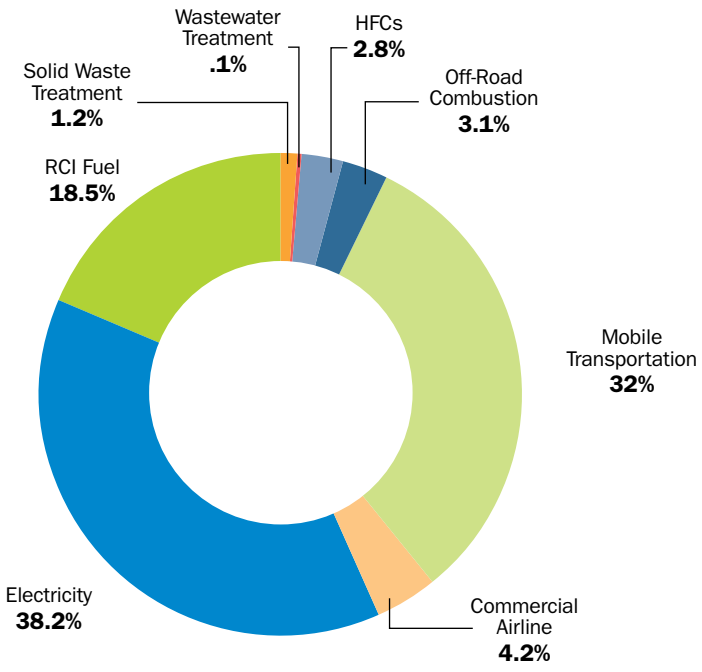
Achievement of 2012 Regional Goal

COG staff has conducted a comparative analysis of the 2005 and 2012 GHG inventories that confirms that the region has met its first goal of getting GHG emission levels equal to or below 2005 levels. The total regional emissions are estimated to be 69.2 million metric tons of CO_2 equivalent ($MMtCO_2e$) in 2005 and 68.9 $MMtCO_2e$ in 2012. In both the 2005 and 2012 inventories the mobile transportation and electricity generation sectors account for the largest portions of total regional emissions. Between 2005 and 2012, emissions from residential, commercial, and industrial (RCI) fuel use decreased by almost three million $MtCO_2e$; however, many of the other sources increased slightly in the interim.

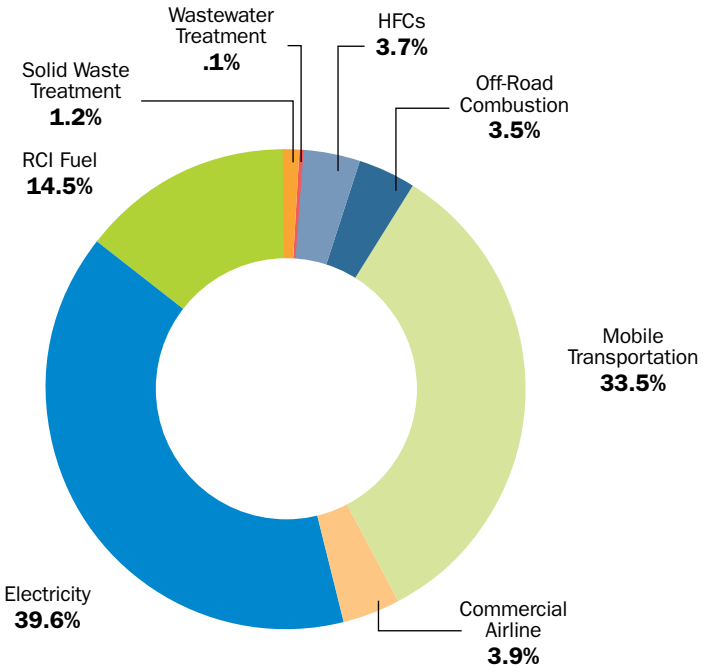
In addition, regional population increased by more than 500,000 residents to approximately 5.2 million between inventory years. Population growth is closely linked to increases in employment, housing, and other measures, which tend to increase GHG emissions. However, based on the results of COG's comparison of the 2005 and 2012 inventories, per capita emissions decreased more than 10 percent and the region was able to meet the 2012 target despite the regional economic and population growth.

GHG inventories confirm that the region has met its first goal of GHG emissions at or below 2005 levels.

2005 Regional GHG Emissions by Activity



2012 Regional GHG Emissions by Activity



Local Achievement in GHG Reduction

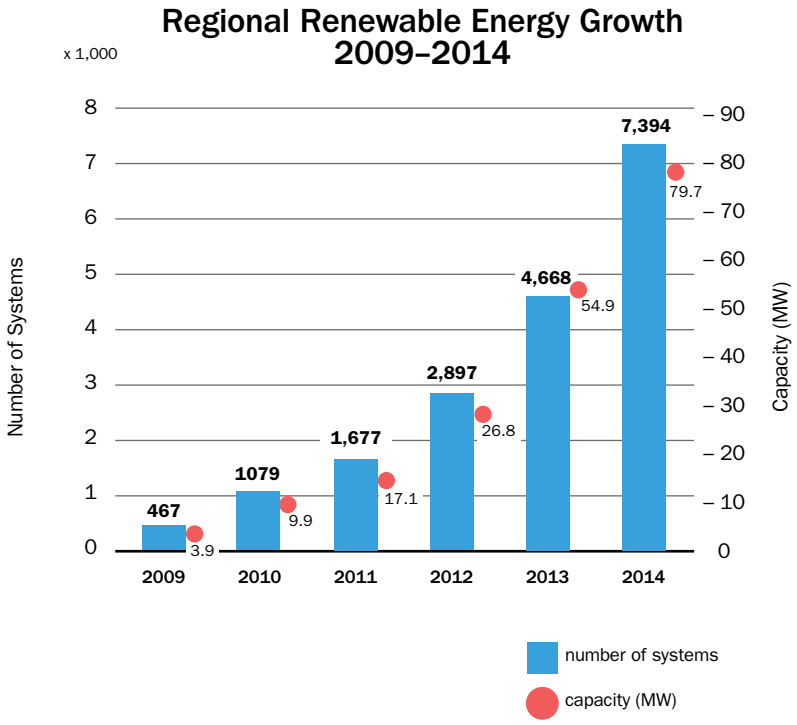
Frederick County's Sustainable Action Plan for County Operations was developed by a 32-member cross-departmental team of county employees. Adopted in 2010, the plan set a goal to reduce overall internal GHG emissions 25 percent by 2025 (below 2007 levels). In August 2015, the County announced a 10.5 percent reduction in GHG emissions from county operations between 2007 and 2012. Reductions were attributed to the Reichs Ford Road Landfill's gas-to-energy project that began producing energy in 2010, along with reductions from energy efficiency practices in county buildings and facilities such as replacing inefficient lights with LEDs, upgrading HVAC systems, and improving building system controls.

RENEWABLE ENERGY

Metropolitan Washington has met and surpassed CEEPC's goal of 5,000 grid-connected renewable energy systems. Distributed renewable energy deployment has been growing steadily since 2009, and booming for the last two years. The chart below shows the number of grid-connected solar and wind systems and total installed capacity for the region since 2009, according to data provided to COG by the region's electric utilities. The region now has over 7,300 grid-connected solar and wind systems. However, the region is far from reaching its goal of 10 percent renewable electricity generation. According to data from PJM, renewable energy resources (including generators of all fuel types accepted by Washington, D.C. and Maryland Renewable Energy Credit markets) only comprise 0.65 percent of the region's electricity consumption.

The region has over 7,300 grid-connected solar and wind systems and growing.

Organizations like the DC Sustainable Energy Utility, Grid Alternatives, and local government members have provided leadership to help the region meet and surpass CEEPC's 5,000 grid-connected renewable energy system goal.



The DC Sustainable Energy Utility

Since 2011, the DC Sustainable Energy Utility (DCSEU) has worked to bring solar technology to low-income residents, installing approximately 30 percent of the District's total renewable generating capacity. Last year, the DCSEU also helped create more than 159,000 hours of work at or above the city's living wage for the District's residents and invested more than $4 million with District-based certified business enterprises (CBEs). In fiscal year (FY) 2014 alone, more than 47,000 households and 500 businesses received energy efficiency or renewable energy services from the DCSEU. Ratepayers' FY 2014 investment of $18 million in energy efficiency and renewable energy will provide $105 million in lifetime savings to District residents and businesses. Ratepayers' FY 2014 investment of $18 million in energy efficiency and renewable energy will provide $105 million in lifetime savings to District residents and businesses. All told, the DCSEU's work prevented 50,000 metric tons of carbon emissions in 2014.

Ted Trabue, DCSEU Managing Director, and his team.

Credit: DCSEU

Nicole Steele, GRID Alternatives Mid-Atlantic Executive Director, and Keya Chatterjee, U.S. Climate Action Network Executive Director, on the roof during GRID's Executive Women's solar install on Habitat for Humanity passive homes in Washington, D.C.

Credit: GRID Alternatives

GRID Alternatives

GRID Alternatives is a nonprofit solar installer that makes renewable energy technology and training accessible to underserved communities. They work with community partners, volunteers, job trainees, and homeowners to achieve an inclusive solar economy. GRID Alternatives came to the Mid-Atlantic region in the fall of 2014 and launched their efforts by installing solar on 10 homes in Ivy City, a small, industrial neighborhood in Northeast Washington, D.C. When the District Department of the Environment and the DCSEU launched the Solar Advantage Plus Program in 2015, GRID Alternatives was able to leverage this program to continue to bring the benefits of solar energy and job training to underserved communities in the district.

Bulk Solar Procurement

In 2010, COG partnered with the US EPA Green Power Partnership program to begin pursuing a municipal solar photovoltaic (PV) collaborative procurement across the region. To date, the effort has led to the procurement of over 15 MW, with more on the way. In 2014, the District of Columbia issued a solicitation for more than 10 MW of solar PV capacity at 49 sites across the city. In 2014, Montgomery County issued a request for energy proposals (RFEP) for a third party to develop solar on County facilities. The County awarded SolarCity 5 MW of solar photovoltaic systems across 14 sites and construction on several sites is underway. The County expects to add at least another 2 to 4 MW of projects in the next year. Garrett County is currently riding the County's contract for their project. Rockville, Greenbelt, the City of Frederick, Arlington and others are either planning to ride the county's contract or applying some of the lessons learned for their own procurements. A local small business reserve set-aside RFEP was issued in 2015 for additional solar PV projects sites. The contract once awarded will provide another option for other jurisdictions to ride. The county is in final negotiations to award two microgrid projects involving critical facilities, these sites will likely include solar, combined heat and power generation, and energy storage technologies.

Montgomery County Clean Energy Buyers Group

Montgomery County leads a clean energy buying group including the county government, agencies, and municipalities. Current participants include Montgomery County, Montgomery County Public Schools, Montgomery College, the Maryland-National Capital Park and Planning Commission, Chevy Chase Village, Chevy Chase Village Section 5, the City of Gaithersburg, the City of Rockville, the City of Takoma Park, the Town of Kensington, and the Town of Somerset. The group combined their buying power to purchase renewable energy credits from clean energy sources such as National Wind. The group started in 2004 with a 5 percent purchase. Current participants purchase anywhere from 20 to 100 percent clean energy with the majority opting for 100 percent. Montgomery County has purchased additional RECs to offset the GHG footprint of natural gas and fuel oil use, resulting in carbon neutral buildings. In FY 2016 and 2017, the group will purchase enough RECs to offset the environmental impact of over 453,955,000 kWh of electricity. This purchase offsets over 313,000 metric tons of GHG emissions, equivalent to taking 65,900 cars off the road, installing 86.2 wind turbines, or planting eight million trees. Other jurisdictions can ride the contract using the COG rider.

Solar Cooperatives

Throughout metropolitan Washington, there are a growing number of citizens that are coming together to form solar cooperatives. Based on the same principle as buying in bulk, solar co-ops allow groups of neighbors to go solar together and get a discount, making solar more accessible and affordable. By going solar as a group, each participant saves up to 20 percent on the cost of their system and gets support from their peers as they go through the process. The co-op selects a single contractor to install systems on all of the homes, but each participant owns his or her system and signs their own contract with the chosen installer.

Community Power Network, a nonprofit organization with programs in the District of Columbia, Maryland, and Virginia (DC SUN, MD SUN, and VA SUN), is one such organization helping communities organize solar co-ops. With the help of their state SUN groups, communities in the region have launched 36 solar co-ops and counting since 2014. Although some of the groups are still in progress, the co-ops have engaged over 3,000 citizens, helped facilitate 541 solar installations, and lead to 3.2 MW of solar installed since 2014. Combined, the co-ops have resulted in over $9.6 million in residential solar investments in the region, and co-op members have saved an estimated $3.2 million in system costs.

Prince George's County Climate Change Team helps promote the Solar Co-Op in University Park.
Credit: Community Power Network

Community Power Network hosts a community meeting in Bowie, Maryland.
Credit: Community Power Network

Solar co-op banner hangs in Rockville.

City of Rockville receives their Climate and Energy Leadership Award.

CLIMATE AND ENERGY LEADERSHIP AWARDS

COG presented the First Annual Climate and Energy Leadership Awards in 2014, recognizing the City of Falls Church, the City of Rockville, Prince William County, and Loudoun County Public Schools for their outstanding efforts to reduce GHG emissions and increase energy efficiency. The awards recognize and encourage local actions to advance regional climate and energy goals established by leaders at COG.

The awards were distributed at the October 2014 COG Board of Directors meeting by CEEPC Chairman Berliner and U.S. Environmental Protection Agency (EPA) Chief of Staff Gwendolyn Keyes Fleming.

City of Rockville

Rockville's green building and energy initiative promotes greener and more efficient commercial, residential, and municipal buildings. The initiative includes green building regulations adopted in 2010 and updated in 2012; incentives such as the High Performance Building Tax Credit for Existing Commercial Buildings; an energy policy for municipal facilities and operations with a 15 percent electricity reduction goal and a 20 percent renewable energy generation goal; as well as education and outreach. Rockville is home to over 4.6 million square feet (sf) of Leadership in Energy and Environmental Design (LEED) certified space; 7.2 million sf of ENERGY STAR space; and over 300 professionals. Overall electricity consumption by properties located in Rockville zip codes has decreased by 40 million kilowatt hours (kWh) between 2009 and 2013.

City of Falls Church

In September 2013, the City of Falls Church became an EPA Green Power Community (GPC)—the first in Virginia. This achievement resulted from an effective partnership among the city, Dominion Virginia Power (DVP), and 3Degrees to publicize and recruit city businesses and residents to purchase renewable energy. The renewable energy target for the city was 4,371 megawatt hours (MWhs) or 3 percent of the community's total energy use. The environmental impact of the green power is equivalent to removing more than 3,000 metric tons of carbon dioxide from entering the atmosphere. Having reached the GPC target with limited resources, this city demonstrated the ability of a small jurisdiction to initiate a significant change in regards to energy and climate change.

Falls Church Council Member Daniel Sze (left) and Green Power Community participants gather to celebrate the initiative's success.

Credit: City of Falls Church

Prince William County

The Prince William County Landfill Gas to Energy System captures the gas produced by the decaying trash disposed in the landfill and feeds the collected gas into engines that generate electricity for local residents. The system uses 90 percent of the methane gas produced by the landfill, which generates 6.8 megawatts (MW) of power. The energy generated is equivalent to meeting the electricity needs of more than 5,000 Prince William County households or over one percent of Northern Virginia Energy Cooperative's (NOVEC) total annual requirement. In addition, the county receives a portion of the proceeds from the energy sales, which help offset the cost of landfill operations, another win for Prince William County taxpayers.

Prince William County's Tom Smith, Todd Bruun and Supervisor Martin Nohe "flipping the switch" on an iPad to start one of the three new engines.

Credit: (left) Prince William County, (right) ENERGYneering Solutions, Inc

Loudoun County Public Schools

Loudoun County Public Schools' Energy and Water Management Program was established in 1993 as a commitment to the conservation of resources while maintaining safety, education, and productivity throughout the school system. Over the last 21 years, LCPS has saved over $64 million on utility costs—equivalent to hiring over 1,300 first year teachers or educating over 5,200 pupils for a year. In addition, 62 LCPS schools have earned the ENERGY STAR rating (representing over 70 percent of LCPS schools and 6.5 million square feet). Cumulative energy use reductions at all LCPS schools since 1993 represent the elimination of over 302,000 metric tons of carbon dioxide emissions. This is equivalent to removing 63,105 cars from the road for a year or planting 7.7 million tree seedlings and growing them for ten years.

Energy Education Specialists John Lord and Michael Barancewicz teach students about energy efficient lighting.

Credit: Loudoun County Public Schools

NET ZERO ENERGY

The idea of net zero energy is transforming the way we think about building energy use. Through a reduction in overall use, energy recovery, cogeneration, and renewable energy production that maximizes productivity and efficiency, net zero buildings produce on an annual basis as much renewable energy as they consume. An increased number of buildings are meeting these unprecedented standards as technologies and design pave the way for self-sustaining architecture.[1] There are a number of public and private projects across the region striving for net zero energy. Net goals and innovative initiatives will help the region meet its GHG emission reduction goals.

Sustainable DC

The Sustainable DC Plan has goals for a 50 percent reduction in energy use, and for renewable energy to make up 50 percent of the District's total energy use, both by 2032. In addition, the plan calls for net zero standards for new construction and to retrofit 100 percent of all existing commercial and multi-family buildings to achieve net zero standards by 2032. In support of the Sustainable DC Plan, DC Public Libraries issued a request for proposals for their Cleveland Park Library to be net zero energy. They awarded the project in April 2015 and are working on the design. The Land Disposition Agreement for redevelopment of Walter Reed Army Medical Center will include goals for net zero energy, waste, and water.

[1] Source: Army Net Zero Initiative

Metro's Net Zero Energy Stormwater Facility

Metro's new stormwater facility in Prince George's County, Maryland is designed to be net zero. The water treatment system minimizes energy use with its gravity-fed treatment tanks and uses bubbles of compressed air to circulate water instead of traditional high energy pumps. Each day the facility treats 1.4 million gallons of water. The roof-top solar panels produce over 13,000 kWh of electricity per year while avoiding an estimated three tons of carbon emissions. In addition, a green roof and onsite controls reduce stormwater runoff. The innovative design elements at this facility serve as an example of Metro's commitment to the targets adopted in their 2014 Sustainability Agenda.

Installation of solar panels at Metro's net zero energy stormwater facility.

WMATA Members of the project team, led by Metro's Carla Grano, lead COG stakeholders through a tour of the new facility.

Prince George's County Net Zero Renovation

Prince George's County Redevelopment Authority constructed the county's first net zero energy home in Suitland, Maryland. The Authority purchased the 100-year old single family vacant home on foreclosure. The renovated home provides superior energy savings, water efficiency, and a healthy living environment. It meets net zero, LEED Platinum, and ENERGY STAR Standards by incorporating 20 solar panels (including four for solar water heating), closed cell insulation, an efficient, HVAC mini-split system, and energy efficient windows, fixtures, and appliances. The home is within walking distance to Suitland Metro Station and the Suitland Federal Center. This project has inspired additional net zero projects by the Authority, including a net zero energy affordable housing new construction project in Mount Rainier.

Howard Ways, Prince George's County Redevelopment Authority, and the project team lead a tour of 2015 Housing Fair participants through the net zero home.

Arlington Public Schools – Discovery Elementary School

Opened this September, Discovery Elementary School has been designed to be a net zero school with a 497 kW solar PV system that will produce approximately 613,558 kWh annually. The school's many sustainable features include 1,706 roof-mounted solar panels, a geothermal well field, solar pre-heat of domestic hot water, 100 percent LED lighting, ideal solar orientation and shading, exterior walls with high thermal mass, and bioretention areas that clean and slowly release stormwater. These sustainable features become part of the

students' curriculum creating an active, project-based learning environment. Students have access to a second floor solar laboratory for hands-on experiments and an Eco-Screen that shows how the building operates on a daily basis with real-time energy and water data.

(left) Discovery Elementary School's rooftop solar, (right) and their dining hall.

Credit: Arlington Public Schools

Alice Ferguson Foundation Net Zero Campus

Education, inspiration, and innovation have been the guiding principles of the Alice Ferguson Foundation (AFF) over the past six decades as it has served nearly half a million students through its environmental education programs. The Foundation's Potomac Watershed Study Center in Prince George's County, Maryland is the first multi-building complex in the world to embrace the rigorous standards of the Living Building Challenge™. The Challenge requires that buildings meet net-positive energy and water standards, achieve carbon neutrality, and be constructed with non-toxic, non-polluting materials. The buildings will be a teaching tool for thousands of students annually as part of their day and overnight field studies. Students will receive 'budgets' for their energy and water usage throughout their stay and a 'dashboard' monitoring system will help them track their goals.

Local officials participate with the Alice Ferguson Foundation groundbreaking for the net zero campus. Pictured left to right is (former) AFF Board President, Michael Herman; Prince George's County Council Members Karen Toles, Andrea Harrison, and Mel Franklin (Chair); Prince George's County Executive Rushern Baker; Howard County Executive Kenneth Ulman; 5th Grade student at Heather Hills Elementary School, Bowie, MD, Owen Zeigler; and AFF Executive Director Lori Arguelles.

The day-use building, nicknamed “Grass,” will be the first completed of four buildings.

Credit: Alice Ferguson Foundation

Army’s Net Zero Initiative

The Army’s Net Zero Initiative aims to have 25 net zero energy, water, and waste installations by 2030. The initiative was launched in 2011 with 17 pilot installations to serve as test beds for emerging best practices and technologies, setting a foundation for institutionalization. In metropolitan Washington, Fort Detrick was selected in a competitive application process to pilot net zero energy by 2020. Gas steam plant decentralization underway will save an estimated 20 percent of the total site energy load. A 15 MW microgrid-compatible solar installation under development consists of 60,000 solar panels over 67 acres and will provide approximately 10 percent of the installation’s energy use.

Federal and state officials at the groundbreaking for the solar installation on April 1, 2015.

Credit: U.S. Army

ZERO WASTE

Zero waste is the aspirational, long-term goal of eliminating the disposal of solid waste. It involves a reinvention of the way we use products. First, products need to be designed to prevent and reduce waste before it even occurs. Implementing strategies of this nature reduces emissions, saves energy, and extends landfill capacity. Several forward-thinking entities are undertaking ambitious zero waste goals.[2]

American University Zero Waste Policy

In 2010, American University (AU) adopted a Zero Waste Policy that calls for the university to strive to send zero waste to landfills and incinerators.

Two major initiatives towards achieving that goal include campus-wide collection of organic waste and Project Move-Out. As part of the organic waste collection infrastructure, all buildings on campus were equipped with compost bins, and large exterior compactors were dedicated to organics. A phased approach to send AU organics to a local commercial composting facility also is under way. Composting kitchen waste from dining halls and coffee grounds are targeted to be included in the first phase of the proposed composting, set to begin in January 2016.

In addition to organic waste collection, the Project Move-Out initiative has resulted in the reduction of waste from students as they leave campus at the end of the school year. Clothes, shoes, unopened food and toiletries, bedding, electronics, books, school supplies, and other items are collected and donated or sold back to students during move-in at a lower cost.

Students participate in a RecycleMania Challenge at an AU basketball game.

Credit: American University

[2] Source: Maryland Zero Waste Plan

Sustainable DC Zero Waste

The goal of the Sustainable DC Plan is to make the District of Columbia a zero waste community by 2032. The District produces approximately 800,000 tons of solid waste annually, which costs over $100 million dollars to transfer, haul, and dispose. Therefore, the District plans to turn waste into an economic opportunity by increasing material reuse, recycling, and composting in addition to generating less waste in the first place. The District has set three targets to help the city reach these goals including (1) send zero waste to landfills and reduce waste generation by 15 percent, (2) reuse 20 percent of all construction and demolition waste, and (3) achieve 80 percent waste diversion rate.

Neighbors in Anacostia after a successful neighborhood clean-up.

Credit: District Department of Energy and Environment

Maryland Zero Waste Plan

The State of Maryland's 2013 GHG Emission Reduction Plan established a zero waste goal. The framework for achieving that goal is in Maryland's 2014 Zero Waste Plan that outlines how to achieve 85 percent waste diversion by 2040. This would result in GHG emission reductions of 4.8 $MMtCO_2e$ annually relative to the 2006 baseline year. The 2014 Plan identifies nearly 60 progressive actions for waste reduction, reuse, recycling, energy recovery goals, and policy reforms. In the near term, the state has been working to facilitate the development of food scrap composting, implement special events recycling, implement multi-family recycling, and increase recycling at state agencies.

Metro Sustainability Agenda's Zero Waste Goal

Metro's transit service improves air quality by avoiding 260 tons of VOCs, 22 tons of particulate matter, and 0.5 million tons of carbon dioxide each year due to reduced auto use. In 2014, Metro adopted a Sustainability Agenda to further its commitment to environmental protection and reduce operating costs. As part of the agenda, Metro adopted a long range zero waste goal. Some current initiatives include reducing facility lighting and bus battery waste through use of more efficient and durable technology, enhanced composting, and the use of a 100 percent recycled premium steel for all rail replacement. Metro will explore new opportunities to reduce waste, expand recycling, and work with suppliers to reduce packaging waste.

ZERO EMISSION VEHICLES

Zero-emission vehicles (ZEVs) produce no greenhouse gas or other pollutant tailpipe emissions. Most major auto manufacturers now produce ZEV models and there are an increasing number of ZEVs available on the market. There are a variety of ZEV types: battery electric vehicles (all electric), plug-in hybrid electric vehicles (uses electric and gas), and hydrogen fuel cell vehicles (generate electricity from hydrogen). Various programs serving the region have encouraged progress toward the adoption of zero emission vehicles.[3]

Zero Emission Vehicle Memorandum of Understanding

In 2013, eight states, including Maryland, signed onto the Zero Emission Vehicle Memorandum of Understanding (ZEV MOU) and the Multi-State Action Plan was released in 2014. The ZEV Action Plan calls for partnering states to develop infrastructure, coordinate policies and standards, and build the market with a goal of getting 3.3 million ZEVs on the road by 2025. Maryland initiatives that support the ZEV MOU include the Clean Cars Program that adopted California's stricter vehicle emission standards, investment of over $1.5 million in public charging stations, and offering a variety of incentives and grants. Maryland has also been conducting EV readiness workshops with local governments using guidance developed by the Transportation and Climate Initiative.

There are now more than 1,700 EV charging stations in the northeast and mid-Atlantic regions, thanks to support from the Transportation and Climate Initiative (TCI).

Transportation and Climate Initiative

The Transportation and Climate Initiative (TCI) was launched five years ago by 11 northeast and mid-Atlantic states (including Maryland) plus the District of Columbia. TCI is facilitated by the Georgetown Climate Center and the goal of TCI is to reduce emissions from the transportation sector and to help build the clean energy economy. TCI launched the Northeast Electric Vehicle Network to enable electric vehicle (EV) travel throughout the region and has more than 80 partners committed to this effort. With TCI's support, public EV charging stations in the past three years have grown by 190 percent to more than 1,700 stations and the number of EVs has increased thirty-fold. TCI provides legal and policy support and has produced numerous planning, guidance, and analysis documents to support state and local EV readiness.

[3] Source: Multi-State ZEV Task Force

The Georgetown Climate Center's Vicki Arroyo and TCI participants Brett Taylor (Delaware Department of Transportation), Phil Cherry (Delaware Department of Natural Resources and Environmental Control), Sue Minter (Vermont Agency of Transportation), and Jim Redeker (Connecticut Department of Transportation) celebrate five years of collaboration.

Credit: TCI

Frederick County TransIT Electric Bus Fleet

Frederick County is making an innovative move to transition its fleet to all-electric buses. Procurement for the first five buses and a charging station is currently underway. Next year, pending funding availability, the county plans to purchase up to four electric buses and up to another four the following year.

The buses are refurbished from older diesel powered models to all-electric. They are expected to get up to 150 miles per charge with a fuel economy of more than 20 miles per gallon-diesel equivalent. The county's current fleet average is 4 mpg, and the average bus is driven 22,000 miles. That provides a savings of 17,948 gallons diesel equivalent per bus per year and well over $450,000 over the lifetime of each bus on fuel and maintenance costs.

WATER/WASTEWATER

One of the largest energy users in a community can come from water and wastewater treatment facilities. The process of treating water and wastewater involves the operation of pumps, motors, and other equipment all day, every day; therefore, equipment upgrades and operational modifications at treatment facilities provides a significant opportunity to reduce energy use and decrease greenhouse gas emissions produced by these facilities.[4] Water and wastewater entities in the National Capital Region, such as Fairfax Water, Alexandria Renew, and DC Water, are aggressively implementing projects that reduce energy use at their facilities.

Fairfax County's Water Reuse Project

The Noman M. Cole Jr. Pollution Control Plant, owned and operated by Fairfax County Government, is the largest advanced wastewater treatment plant in Virginia. The Plant provides treated non-potable water for non-residential irrigation and industrial purposes. Treated non-potable water is also delivered to the nearby Energy Resource Recovery Facility to help power the waste-to-energy plant. Last year approximately 480 million gallons of non-potable water was delivered for its use in generating electricity. Since less energy is used to produce the reclaimed water compared to potable water, more than 1.4 million pounds of CO_2e are avoided each year.

A purple pipeline carries treated reclaimed non-potable water from the Pollution Control Plant to the Energy Resource Recovery Facility.

Credit: Fairfax County

[4] SOURCE: U.S. Environmental Protection Agency Local Government Climate and Energy Strategy Guide on Energy Efficiency in Water and Wastewater Treatment Facilities: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs.

Alexandria Renew Energy Neutrality Goal

Alexandria Renew Enterprises (AlexRenew), the facility that cleans Alexandria's wastewater, is committed to supporting a healthy and resilient local economy. Alex Renew is developing and implementing innovative ideas and technologies to enhance resiliency and sustainability. AlexRenew adopted goals and has implemented a variety of measures for energy neutrality, reducing energy consumption, and increasing energy production.

Alexandria Renew team pours sludge with anammox microbes into the centrate pretreatment facility

Credit: Alexandria Renew

AlexRenew uses almost 100 percent of the methane it produces to help operate its facilities. AlexRenew is also the first to implement full-scale sidestream and mainstream anammox operations, which saves energy in the water cleaning process. Using anammox to treat water can result in a 25 percent reduction in energy usage and a significant reduction in greenhouse gas emissions compared to conventional methods.

DC Water

In October 2015, DC Water unveiled its $470 million waste-to-energy project at the Blue Plains Advanced Wastewater Treatment Plant. The project uses the CAMBI® thermal hydrolysis process, an innovative technology never used before in North America, to produce a net 10 megawatts (MW) of electricity from the wastewater treatment process. That is enough energy to power about one-third of the plant's energy needs. Blue Plains is now the largest thermal hydrolysis installation in the world and the facilities include a dewatering building, 32 sleek thermal hydrolysis vessels, four concrete 80-foot high anaerobic digesters that hold 3.8 million gallons of solids each, and three turbines the size of jet engines. The methane from anaerobic digestion is captured to produce electricity.

DC Water CEO and General Manager, George Hawkins, kicks off the Bioenergy Facility Commissioning Ceremony in October 2015. Mayor Muriel Bowser, Councilmember Mary Cheh, Director of the District Department of Energy and Environment Tommy Wells, and Congresswoman Eleanor Holmes Norton were among the distinguished guests.

Credits: DC Water

CLEAN TECH

The 2015 U.S Clean Tech Leadership Index ranked the metropolitan Washington area fifth for clean-tech activities (out of the largest 50 metro areas in the nation). The Index evaluated more than 20 indicators ranging from green buildings, advanced transportation, clean electricity, carbon management, and clean tech investment and innovation. Initiatives by organizations like Bethesda Green, Alexandria Emerging Technologies Center, and WMATA's Sustainable Lab are exemplary of initiatives that aim to advance the region's clean tech economy and reduce GHG emissions.

Bethesda Green Incubates Sustainable Business

Bethesda Green, a 501(c)(3) nonprofit, serves as a hub to catalyze businesses, government, and residents to create a more sustainable community and economy. Their work's focus is: education and outreach, facilitating green solutions, and housing a next-generation green business incubator. The incubator serves the Washington, D.C. region and is broadly focused on growing green products, technology, and services. The incubator's stakeholder constituency of government, business, and community draws in diverse resources and ideas while magnifying the incubator's impact on the region's economy. In 2014, Bethesda Green start-ups raised over $1 million in financing and had revenues of over $1.7 million. The incubator continues to evolve to meet the needs of our region's community.

Bethesda Green's Incubator Manager, Bob Snyder, and Executive Director, Veronique Marier, gather with incubator participants prior to the "Driving Sales" incubator training session.

Credit: Bethesda Green

Alexandria Emerging Technologies Center

The Alexandria Emerging Technologies Center's (AETC) mission is to "connect the local and regional business community, entrepreneurs, innovators, investors, citizens, and governments to incubate, educate, showcase, and integrate new and emerging technologies to drive wealth and job creation in the new green economy and improve quality of life by reducing our collective impact on the environment." Incubator participants receive mentorship and training and are then connected with experts, business coaches, investors, workforce partners, and crowd funding. AETC's Green Citizen Academy engages the citizens and students in conversation about the value and potential of green technology.

WMATA Sustainability Lab

In 2014, Metro launched its Sustainability Lab, which is dedicated to identifying and piloting cost-saving technologies and practices, and proving return-on-investment. The goal of the lab is to push new sustainable technologies forward for implementation in the region and across the country. Thus far, the Lab has implemented energy, water, and waste projects that are expected to save $550,000 in operating costs over the next five years. For example, upgrades to water treatment systems at seven station chiller plants are estimated to save three million gallons of water and $60,000 per year. If the pilot performs as expected, a full system roll out would produce nearly $700,000 in water savings each year.

ENGAGEMENT

Real advances occur when communities are empowered to make decisions and manage change. Events, organizations, and partnerships have been key in involving the community to advance local action and meet regional climate change goals.

Charles County 2014 Green Expo and Tech Showcase

Charles County held a Green Expo and Tech Showcase event on August 9, 2014 at the Southern Maryland Blue Crabs Baseball Stadium in Waldorf, Maryland. The Green Expo featured vendors such as Solar City, P.A. Bowen Farmstead, MOMs Organic Market, and the Chesapeake Bay Trust. COG also participated by giving away hundreds of energy and water saving products for the home and encouraging participation in the upcoming Bike to Work Day. The Tech Showcase featured a selection of electric vehicles provided by local dealers. Eco-Shred provided free, secure document shredding and residents brought approximately 15,000 pounds of paper for shredding and recycling. Despite the rain, the event had more than 5,200 attendees.

Clean Air Partners

Clean Air Partners is a nonprofit organization that seeks to improve the health and quality of life of residents in the Baltimore-Washington region by encouraging individuals and organizations to take voluntary actions to reduce air pollution, including GHG emissions. For the past eight years, Clean Air Partners has been implementing On the Air: Exploring Air

(top) A Charles County family is getting ready to take a bite out of energy vampires with a Kill-A-Watt meter giveaway from COG.

(left) Rebecca Davis engaging students with the Clean Air Partner's On the Air curriculum.

"Energy vampires" refers to electronics and appliances that appear to be turned off but are still "sucking" energy. Kill-A-Watt meters help residents measure the energy levels of devices while turned off and in use to help residents identify where they can save energy.

Pollution Sources and Solutions, an interactive air quality and climate change curriculum that has reached tens of thousands of students across the region. Clean Air Partners also sponsors slogan, poster, and infographics contests throughout the school year that encourage students and educators to study and actively pursue solutions to air pollution and climate change.

Fairfax Employees for Environmental Excellence

The Fairfax Employees for Environmental Excellence (FEEE) serves as the County's employee team to foster a greener workplace culture. The FEEE has grown from 15 to nearly 400 employees in three years. FEEE focuses on employee behavior and empowering employees to be environmentally responsible. They encourage employees to take advantage of existing environmental programs as well as develop creative solutions to promote sustainable County operations. FEEE has launched several action campaigns such as Junk the Junk Mail that reduced junk mail of participants by over 70 percent and the Take the Stairs Week that logged more than 3,000 trips taken by stairs instead of elevators. FEEE also has a Fairfax Sustainability Champions awards program and hosts lunch-and-learns and tours.

FEEE hosted a Green Lounge for Fairfax County employees to have fun learning about going green at work and home.

Credit: Fairfax County

Sustainable DC Ambassador Program

Since 2013, the Sustainable DC Ambassadors Program has trained District residents to talk to their friends and neighbors about the importance of sustainability and how their decisions affect the livability and health of their community. The program creates opportunities for powerful peer-to-peer conversations about the benefits of energy efficiency, renewable energy, water conservation, and sustainable materials management. The objective is to not only build awareness of and support for sustainability programs and policies, but ultimately to encourage District residents, workers, and visitors to make more sustainable decisions supporting the goals of Sustainable DC. With a strong emphasis on underserved populations within the city, the Sustainable DC Ambassadors program

engages the community in meaningful conversations about sustainability at a level not possible when delivered by government representatives alone. The program is currently in its third year, with 60 active ambassadors.

Resilient DC

Resilient DC, led by the District of Columbia Department of Health (DOH), is working to strengthen the community's ability to be prepared for and recover from emergencies and disasters. Resilient DC brings neighborhoods together to support each other before, during, and after a disaster. DOH surveyed community-based and government organizations to identify existing activities and resources that can be leveraged for Resilient DC. DOH has also organized community forums and workgroup meetings to identify opportunities for collaboration as part of a strategic plan. Resilient DC's public outreach campaign and testing resilient-building strategies to meet specific neighborhood needs are a critical part of the effort to assist the elderly and those with health concerns or other limitations and needs.

Arlington Energy Journey Game

The Arlington Initiative to Rethink Energy (AIRE) offers a variety of programs to help the community make smart energy choices. In 2013, AIRE launched the Energy Journey Game, a life-sized board game where participants participate in a series of stations and activities that test their energy IQ. Experts are on hand to help residents improve their knowledge as well as take advantage of community programs to help them have a more energy efficient and sustainable home. Experts included representatives from Arlingtonians for a Clean Environment (ACE), Virginia LEAP (residential energy efficiency), Virginia SUN (residential solar), and the Green Home Choice Program (sustainable home design and building). The Energy Journey Game attracted more than 800 players over three events.

Families come together to play the Energy Journey Game in Arlington County.

Credit: AIRE

CONCLUSION

Metropolitan Washington was able to meet the primary goal for emissions reductions, and is making headway on the future goals set for the region. Despite sizable population and economic growth between 2005 and 2012, the region met the first target of getting emissions equal to or below 2005 levels by 2012. Regional renewable energy development has grown rapidly since 2005, with help from local organizations and governments, surpassing the CEEPC goal of 5,000 renewable energy systems by a large margin.

Although significant progress was made toward the long-term goals of the region, there is still work to be done to meet the future targets. With this in mind, cities, counties, nonprofits, and others have implemented several efforts to advance net zero energy, zero waste, and zero emissions vehicles, as well as pursue clean technology initiatives, and increase energy awareness and community engagement. These efforts have already made important impacts and will continue to help the COG jurisdictions reach their individual and regional targets.

RESOURCES

CLEAN TECH

2015 U.S. Clean Tech Leadership Index
http://cleanedge.com/indexes/u.s.-clean-tech-leadership-index

Alexandria Emerging Technologies Center
http://alexandriaetc.org/

Bethesda Green
http://bethesdagreen.org/

Metro – Sustainability Initiative
http://www.wmata.com/about_metro/sustainability.cfm

CLIMATE AND ENERGY LEADERSHIP AWARDS

http://www.mwcog.org/environment/climateawards/

City of Rockville – Environment and Sustainability
http://www.rockvillemd.gov/index.aspx?NID=287

City of Falls Church – Green Power Challenge
http://www.fallschurchva.gov/536/Green-Power-Challenge

Loudoun County Public Schools – Energy and Environment Team
http://www.lcps.org/Page/1841

Prince William County – Eco Park
http://www.pwcgov.org/ecopark

ENGAGEMENT

Arlington Initiative to Rethink Energy – Energy Journey Game
https://www.youtube.com/watch?v=EPu8vWMcY7M

Clean Air Partners
http://www.cleanairpartners.net/

Fairfax County Environmental Quality Advisory Council - Annual Report on the Environment
http://www.fairfaxcounty.gov/dpz/eqac/report2015/

Resilient DC
http://doh.dc.gov/resilience

Sustainable DC - Ambassadors Program
http://www.sustainabledc.org/volunteers/

GREENHOUSE GAS EMISSIONS

Frederick County - Managing Climate Change
http://bit.ly/1RzXYTN

NET ZERO ENERGY

Arlington County – Net Zero School
http://bit.ly/1OGaThn

Alice Ferguson Foundation – Building for the Future
http://fergusonfoundation.org/living-building-on-the-potomac/

Metro – Net Zero Energy Stormwater Facility
http://www.wmata.com/about_metro/news/PressReleaseDetail.cfm?ReleaseID=5806

Prince George's County – Net Zero Energy House
https://www.youtube.com/watch?v=9ebyQOR3OEY

Sustainable DC
http://www.sustainabledc.org/

U.S. Army – Net Zero
http://www.army.mil/article/145919Fort_Detrick_Breaks_Ground_on_Renewable_Energy_Project/

RENEWABLE ENERGY

DC Sustainable Energy Utility
https://www.dcseu.com/

GRID Alternatives
http://www.gridalternatives.org/midatlantic

Montgomery County - Department of General Services' Office of Energy and Sustainability
http://www.montgomerycountymd.gov/dgs-oes/

ZERO EMISSION VEHICLES (ZEV)

Frederick County – TransIT Electric Bus Fleet
https://frederickcountymd.gov/105/TransIT

Multi-State ZEV Task Force
http://www.zevstates.us/about-us/

Transportation and Climate Initiative
http://www.transportationandclimate.org/celebrating-five-years-success

ZERO WASTE

American University – Zero Waste
http://www.american.edu/finance/sustainability/waste.cfm

Maryland Department of the Environment – Zero Waste Plan
http://www.mde.state.md.us/programs/Marylander/Pages/ZeroWastePlan.aspx

Metro – Sustainability Initiative
http://www.wmata.com/about_metro/sustainability.cfm

Sustainable DC
http://www.sustainabledc.org/


COG Member Jurisdictions
Frederick County
City of Frederick
Montgomery County
City of Gaithersburg
City of Rockville
City of Takoma Park
City of Greenbelt
City of College Park
Town of Bladensburg
City of Bowie
Loudoun County
Fairfax County
City of Falls Church
District of Columbia
City of Fairfax
Arlington County
City of Manassas
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