This report was amended in June 2017 to correct a mathematical error related to the calculation of the change in greenhouse gas (GHG) emissions from the baseline year of 2005. All data on yearly energy use and GHG emissions is unchanged.

The corrections are:

Page 37 – The original report stated “In FY16, GHG emissions from building fuel use are down by more than 27% from the FY05 base year.” The percentage drop has been corrected to “more than 23%.”

Page 42 – The introductory text to Figure 4-5 has been corrected as noted above.
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In June 2014, Montgomery County adopted legislation directing the creation of an Office of Sustainability in the Department of Environmental Protection (DEP). The goal of the Office is to promote sustainability in Montgomery County in collaboration with residents, businesses, and community-based organizations through activities related to energy efficiency and renewable energy, green business development, trees and forests, environmental education and outreach, and other environmental programs.

**Background**

In January 2009, Montgomery County published the [Montgomery County, Maryland Climate Protection Plan (CPP)](https://www.montgomeryparks.org/environment/climateprotectionplan). The CPP was prepared by the Montgomery County Sustainability Working Group (SWG), an advisory panel made up of 26 representatives from government, business, non-profit associations and the public. The SWG was supported by DEP and seven subcommittees made up of nearly 100 other individuals. The CPP contained 58 specific recommendations across a broad spectrum of activities designed to reduce community greenhouse gas (GHG) emissions.
In June 2014, the County Council adopted legislation (County Bill 6-14) that directed the creation of two new offices within the County government to further the work done by the SWG. These two offices – DEP’s Office of Sustainability and the Office of Energy and Sustainability in the Department of General Services (DGS) – would address a broad range of issues intended to maintain Montgomery County as a leader in sustainability.

DGS’s Office of Energy and Sustainability was tasked with undertaking initiatives to make County government operations, including the government’s buildings and fleet, more energy efficient and sustainable. DEP’s Office of Sustainability was to be “outward” facing and work to promote sustainability in the community by developing programs for, and in conjunction with, residents, businesses, and community-based organizations.

As required by Section 18A-13 of the Montgomery County Code, DEP’s Office of Sustainability is required to, among other things:

- Annually report its activities, accomplishments, plans, and objectives
- Annually report actions taken to implement the CPP, and progress toward meeting the greenhouse gas reduction goals in the CPP
- Evaluate options for a broader Countywide sustainability reporting framework
- Apply a scoring system every two years designed to compare the County to other local jurisdictions on energy efficiency policies and programs

**Report Overview**

The 2017 Office of Sustainability Annual Report is structured as follows:

**Section 1: Introduction**

**Section 2: Office of Sustainability Activities** – This section provides a summary of the major programmatic initiatives of the Office during 2016, including the expansion of significant activities related to commercial building energy efficiency programs, the launch of new programs related to residential energy efficiency, and the first full year of planting under the Tree Montgomery program.

**Section 3: Benchmarking Sustainability** – As noted above, the Office of Sustainability is charged with reporting on progress made toward implementing the CPP, benchmarking the County against others with regard to energy efficiency policies and programs, and
evaluating a broader Countywide sustainability reporting framework. This section discusses progress toward achieving these objectives.

**Section 4: Metrics** – This section includes tables, charts and graphs that provide a look at where the County stands relative to a variety of sustainability measures, including building energy use and its associated greenhouse gas emissions.

**Section 5: Partners in Sustainability** – DEP’s Office of Sustainability plays an important role in making Montgomery County more sustainable. However, it is the collective work of residents, businesses, municipalities, other governmental departments and agencies, and a variety of community-based organizations that makes the work of the Office of Sustainability possible. This section highlights just a few of the actions and programs that are representative of the efforts by individuals, businesses, and organizations to make Montgomery County more sustainable.

Note that some information and data in this report is presented on a calendar year basis, while other information and data is presented on a fiscal year (FY) basis; the County’s fiscal year runs from July 1st through June 30th. This is due to the fact that a variety of County, state, and federal sources were used to compile the report, and the timeframe they cover (that is, calendar year or fiscal year) varies.

*Meet Larissa Johnson (in green), the new Residential Energy Program Manager.*
In 2016, the Office of Sustainability (the “Office”) continued to expand programs related to commercial building energy efficiency, added a new staff member to focus on residential energy initiatives, and completed the first full year of planting under the Tree Montgomery program. In addition, the Office continued to look for ways to partner with other programs in DEP, other departments and agencies in the County government, and a variety of individuals, businesses, and organizations to promote sustainability in Montgomery County. This section highlights the Office’s major activities.

**Office Structure**

During 2016, the duties of the Office were being carried out through the positions shown in Figure 2-1.

*New position in 2016*
Commercial Energy Initiatives

In Montgomery County, the commercial sector occupies 69 million sq. ft. of space, and uses roughly 32 trillion Btu of energy annually. To serve this community, the Office implements a number of progressive programs and policies such as building energy benchmarking, innovative and focused financing opportunities, and other educational efforts.

Commercial Building Energy Benchmarking

In May 2014, Montgomery County adopted the Building Energy Benchmarking Law (County Bill 2-14), the first county in the nation to pass such a measure, which requires certain commercial building owners to report their building energy use annually for public disclosure.

Implementation of the Benchmarking Law is on-track and progressing smoothly. The Office was well prepared for the first compliance season by establishing technical support and data management processes and developing extensive outreach materials.

As shown in Figure 2-2, there are three groups required to benchmark annually under the Benchmarking Law.
Figure 2-2
Building Subject to Benchmarking Law

<table>
<thead>
<tr>
<th>Group</th>
<th>Total Building(s)* Sq. Ft.</th>
<th>First Data Year</th>
<th>First Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>County</td>
<td>50,000 +</td>
<td>2014</td>
<td>June 1, 2015</td>
</tr>
<tr>
<td>Group 1 Private</td>
<td>250,000 +</td>
<td>2015</td>
<td>June 1, 2016</td>
</tr>
<tr>
<td>Group 2 Private</td>
<td>50,000 up to 250,000</td>
<td>2016</td>
<td>June 1, 2017</td>
</tr>
</tbody>
</table>

*The Montgomery County law defines a covered building as a non-residential building, or any group of nonresidential buildings that have the same property identification number, that meet the given thresholds and criteria.

Summary of Year One Compliance

The Montgomery County Department of General Services (DGS) continued to “lead by example” by meeting another first milestone in the Benchmarking Law. DGS benchmarked County buildings subject to the law by June 1, 2016 and those building data were publicly disclosed by the County as required by the Benchmarking Law in October 2016. DGS reported data on 14 County-owned facilities totaling more than 1.9 million square feet with ENERGY STAR scores ranging from 12 to 94 out of 100. Data for each building are available for download at: bit.ly/CY15MoCoCountyBuildingData.

During the 2016 compliance period, 91 Group 1 private buildings were benchmarked and reported, 16 buildings qualified for exemptions and 14 buildings were granted waivers. Group 1 buildings that submitted a complete benchmarking report or completed an exemption or waiver form have been deemed compliant. At the time of publication of this report, a compliance rate of 86% was achieved for Group 1 buildings covered under the Law (up from 65% as reported in the October 2016 Annual Report on the Benchmarking Law), and the Office expects this rate to increase as building owners submit completed benchmarking reports.

Compliance Assistance Programming – Education and Outreach

In 2016, the Office continued to provide outreach and training to support the benchmarking process:

- Benchmarking Office Hours: Throughout 2016, the Office hosted monthly Benchmarking Office Hours, and connected with approximately 20 new building owners.
OFFICE OF SUSTAINABILITY ACTIVITIES

- **Benchmarking Website:** As of January 2017, Benchmarking Law resources provided by the Office are continually updated and supplemented. The Benchmarking Law website has received 5,943 unique views since its publication in August 2014.

- **U.S. Department of Energy Standard Energy Efficiency Data (SEED) Collaborative Partnership:** In January 2016, Montgomery County, along with 11 other jurisdictions across the country, partnered with the U.S. Department of Energy on the SEED Collaborative, a strategic effort to assist state and local governments manage, standardize, and share large building performance data sets. The Office continues to use the SEED Collaborative for data tracking and refining of benchmarking data.

- **Benchmarking Jam in Partnership with the U.S. Green Building Council (USGBC):** The Office partnered with USGBC and EPA’s ENERGY STAR program to offer a Benchmarking Jam during the Energy Summit, connecting congregations, nonprofits, and affordable housing communities to Benchmarking Ambassadors, volunteers who have been trained on the Benchmarking Law and can assist building owners with benchmarking.

- **Notices to Building Owners and Managers:** In January 2016, the Office sent 300+ notices to Group 1 building owners and property managers about the Benchmarking Law. In January 2017, the Office sent notices to more than 1,800 building owners and property managers of Group 2 buildings. The number of notices sent out exceeds the number of buildings required to benchmark because the Office attempts to communicate with multiple individuals associated with buildings subject to the law, including property owners, property managers, and building leasing agents. These mailers included custom letters, a benchmarking brochure, checklist, and a case study of a building owner who already benchmarked.

*Panel at the Montgomery County Energy Summit*
Commercial Property Assessed Clean Energy (PACE) Financing

On March 31, 2015, Montgomery County passed Council Bill 6-15, Commercial Property Assessed Clean Energy Program, allowing for commercial and multifamily property owners to finance energy efficiency and renewable energy upgrades to commercial buildings and repay the costs as a surcharge/special assessment on the property tax bill.

The County's C-PACE program is a partnership with the Department of Finance, supported by the County’s third-party program administrator—PACE Financial Servicing (PFS)—and the County-designated lender—Greenworks Lending (GWL). In 2016, strides were made on program implementation, project pipeline development, relationship building with partners and building owners, development of outreach materials, and training.

First C-PACE Project in Montgomery County and the State of Maryland

In 2016, the Office and the Department of Finance were proud to announce the construction of the first C-PACE project in Montgomery County and the state of Maryland—a $1.4 million energy efficiency upgrade project at the Shady Grove Professional Building and Comfort Inn Shady Grove. This project includes energy-efficient HVAC upgrades, boiler replacements, LED light installations, and building envelope improvements. The improvements are expected to save more than 1,600 million Btu of energy annually.

Program Outreach and Education

Throughout 2016, the Office engaged in extensive training and education with building owners, contractors, and other interested stakeholders. Outreach activities included:

- Building Owner C-PACE Open House: In March 2016, the Office hosted an Open House for more than 40 building owners to learn about the benefits of C-PACE and how to apply.

- Montgomery County Energy Summit and Public Launch: In April 2016, the C-PACE program was officially launched at the 2016 Montgomery County Energy Summit, an event with more than 200 attendees. This event highlighted completed projects around the region and provided training for contractors, lenders, and building owners.

- Contractor Trainings: In June 2016, the Office hosted a C-PACE contractor training at the Montgomery County Chamber of Commerce. Additional trainings are planned for 2017.
Launch of the MC-PACE.com Website: A dedicated website for the C-PACE program was launched in October 2016, featuring a contractor directory and an online application.

Pepco Trade Ally Outreach: In November 2016, the Office presented to approximately 70 Trade Ally contractors about the County’s C-PACE program and how Pepco’s utility incentives can work in tandem with C-PACE financing.

Small Business Energy Efficiency Research

In the summer and fall of 2016, the Office, through a contract with the University of Maryland’s Environmental Finance Center (UMD EFC), launched a research project to engage the County’s small business community on barriers to energy efficiency upgrades. Through surveys and interviews with businesses and associations, individual businesses’ day-to-day operations and motivations for energy efficiency decisions were evaluated. The final research report includes a detailed overview of small business operations in the County, as well as recommendations on how to overcome energy efficiency upgrade barriers through new commercial programs offered by the County.
Residential Energy Initiatives

To further progress toward meeting the County's greenhouse gas reduction goals, the Office hired a Residential Energy Program Manager in June 2016 to develop programs addressing energy efficiency and renewable energy opportunities and barriers in residential housing, including the low to moderate income community.

Residential programming has two main goals in mind. The first goal is to enable action by providing information, technical assistance, and motivating programs for all residents to engage in energy saving and clean energy activities. To this end, the Office provides outreach about utility programs such as the Quick Home Energy Check-up, provides community programming and education about ways to save energy at home, and partners with like-minded organizations to promote conservation and clean energy.

The second goal is to increase access to County and state energy programs and resources, especially for those residents with limited income, language barriers, and barriers to investing in their home (e.g. renters in multifamily properties). To support this goal, the Office is partnering with the County Department of Health and Human Services and other entities on such things as translating information resources, facilitating light bulb exchanges at food banks, and partnering with other non-energy services to expand outreach and engagement.
Residential Engagement and Outreach

The Office supports and encourages greater energy efficiency, conservation, renewable energy, and access to energy programs within the County. The Office provides education and engagement to residents of all ages, raising the level of awareness and understanding around the benefits of clean energy and energy conservation. Some examples include:

Montgomery County Solar Cooperative

During the spring and summer of 2016, the Office partnered with MD SUN's efforts to organize a county-wide solar co-op, allowing a group of residents to leverage their purchasing power to install solar as a group. Residents, with the support of MD SUN, issued a competitive bid and selected an installer that will provide 89 installations around the County. The Office helped publicize all the co-op meetings, and attended the event held at the UpCounty Regional Service Center in September 2016.

Energy Exploration Events – an interactive experience for all ages

In Fall 2016, the Office partnered with Montgomery County Public Libraries, Department of General Services (DGS), Pepco, Energy Coaches and MD SUN to provide an Energy Exploration tour, an interactive energy engagement and education program to all types of residents, including renters, homeowners, and residents of income distressed communities.

The focus of the Energy Exploration Tour was to sign up residents for the Quick Home Energy Check-up provided by the Utilities via EmPOWER Maryland. These events also highlighted DGS's energy conservation and renewable energy projects on public buildings.

Five events were held throughout the County: Olney, Burtonsville, Gaithersburg, Silver Spring and Rockville where almost 500 families walked through the Energy Exploration event and over thirty families signed up for Quick Home Energy Checkups on site.

Presentations and Partnerships

This year the Office engaged new partners in our energy efforts, and participated in the following events: Friendship Picnic, World of Montgomery, Green Apple Day of Service, and Montgomery Villages information sessions. Through these events and presentations to Poolesville Green, Green Wheaton, and the Solar Co-op informational sessions, the Residential Program manager personally engaged with 2,456 residents between July and December 2016.
Cross-Sector Energy Initiatives

Montgomery County Green Bank

In June 2015, the Montgomery County Council passed legislation (County Bill 18-15) to create a Montgomery County Green Bank. The Office, in partnership with the Department of Finance, continues to provide support for the implementation and establishment of the County’s Green Bank. In 2016, several milestones were achieved:

- April 2016 – Montgomery County Green Bank Corporation incorporated as a non-profit within the State of Maryland with support from Coalition for Green Capital.
- May 2016 – Completion of a 9-month stakeholder working group process. The process engaged over 60 stakeholders and met as a group or in subcommittees over 20 times. The Work Group report to the County Council and Executive included stakeholder recommendations around governance, capitalization, and vision, as well as a market assessment completed by Coalition for Green Capital and contributed to and reviewed by the Work Group.
• June-July 2016 – Recruitment and Selection of the Board of Directors, facilitated by the Office and guided by a subcommittee of the Work Group.

• July 2016 – Adoption of basic bylaws by founding Board Members; first meeting of the full Board of Directors.

• August 2016 – Designation of the Montgomery County Green Bank Corporation as the County’s green bank under the Green Bank Law.

• Fall 2016 – Adoption of foundational Governance documents, such as more comprehensive bylaws, purpose statement; receipt of gap funding from anonymous donor; appointments of an Acting Executive Director and Special Advisor to the Board.

• Winter 2016-2017 – Establishment of operating procedures pertaining to the Green Bank’s contracting, hiring, procurement, and management processes; establishment of a partnership with the Montgomery County Chamber of Commerce for meeting space; pursuit of private foundation funding; initiation of development of the initial products to be offered by the Green Bank; and a nationwide recruitment effort for the Green Bank Executive Director.

The Office and the Department of Finance continue to provide support to the Green Bank, as provided for in legislation, and via representation by the Directors of DEP and the Department of Finance serving in ex officio positions on the Montgomery County Green Bank Board of Directors. DEP’s Senior Energy Planner was appointed a non-voting Special Advisor position on the Board.
Energy Communications and Outreach

The Office’s energy team is committed to consistent and engaging communications with the community about its programs and activities, including sharing stories of County residents and businesses saving energy or using clean energy. Using three newsletters with different audiences, the Office sends out case studies, blogs, upcoming events, and other energy-related highlights:

- **Energy News** (2,012 subscribers as of February 2017 with an average open rate of 25%; according to a MailChimp.com review of Average Email Campaign Stats by Industry, government newsletters have an average open rate of approximately 26%): The Energy News is a general, residentially-focused email blast that is sent out once a month and includes case studies about energy-saving or clean energy actions, energy-related events (such as solar co-ops), guest blogs from experts in the County, updates on County sustainability initiatives, tips and tricks for saving energy, and sustainability opportunities such as drawings and scholarships.

- **Commercial Energy News** (1,411 subscribers as of February 2017 with an average open rate of 25%): Subscribers of this newsletter receive a monthly email that includes notifications about the County’s benchmarking program, updates on the County’s C-PACE financing program, and other news and events relevant for the commercial building community. The Office also supports a Benchmarking Google Group with more than 100 members for building owners to receive announcements, ask questions, and share lessons learned about benchmarking.

- **Green Bank News** (983 subscribers as of February 2017 with an average open rate of 31%): This newsletter is sent approximately twice a month to publicize Green Bank Board of Directors meeting announcements and materials, relevant articles, as well as announcements about the County’s C-PACE financing program.

The Office’s energy initiatives also garnered additional media attention in 2016 from a variety of sources:

- Residential Energy was featured on the County TV’s *Did You Know* show, episode #61 which was dedicated solely to the Residential Energy Program: [https://youtu.be/jryPYoRUsSY](https://youtu.be/jryPYoRUsSY).

- Residential Energy was also featured on *Montgomery Mosaic* radio show with DEP’s Division of Solid Waste Services to talk about energy waste during the holidays.
The Montgomery County C-PACE program received coverage in *The Baltimore Sun* and *PACENow* related to the first project approved for C-PACE financing in Montgomery County and the state of Maryland.

Montgomery County’s Green Bank was also featured on *The Brookings Institution* blog and mentioned in other energy financing industry publications.

*Energy Explorations was featured on WHAG television.*

**Maryland State Policy Support**

We continue to offer our support for the EmPOWER Maryland program and the important role this program plays in helping our community’s residents and businesses save energy, keep energy costs low, and reduce carbon emissions.

- Office staff served on the Summer Study on Residential Property Assessed Clean Energy Financing as legislated by the General Assembly.
Office staff is active in the proceedings around the state’s Community Solar regulations and tariffs.

Office staff testified in support of the EmPOWER Maryland Program.

**Metropolitan Washington Council of Governments (MWCOG) Energy Programs**

The Office benefits substantially from partnerships within and with MWCOG. Office staff serves on and chairs the Built Environment and Energy Advisory Committee, which advises the Climate Energy and Environment Policy Committee (which also has DEP representation), which facilitates learning on topics such as residential engagement programs, energy financing, and engaging the commercial real estate market. Office staff also serves as lead for the regional PACE Working Group.

**USGBC National Capital Region (USGBC-NCR) Committees**

The Office participates in two USGBC-NCR committees on the Board of Directors—the Montgomery County Branch and the regional Market Leadership Advisory Board. These committees aim to expand green building practices throughout the County and the region by sharing best practices, resources, and events among public and private sectors, as well as between jurisdictions.

**Energy and Air Quality Advisory Committee (EAQAC)**

EAQAC, comprised of Montgomery County residents, is charged with advising the County Executive and Council on issues related to energy and air quality. The Office hosts monthly EAQAC meetings and provides staff support and assistance for EAQAC’s initiatives.
Tree Programs

In Montgomery County, many groups are working to raise the awareness of the benefits of trees, and to improve tree conservation through planting, long-term care, and retention. These groups include community-based volunteers; non-profit organizations; and municipalities and government agencies; and a number of individual residents and businesses. Additionally, the County implements a wide array of programs that enhance tree and forest conservation. The County’s Roadside Tree Law requires tree save plans and mitigation for trees removed on all applications for building, sediment control and erosion, and right-of-way permits. The County’s street tree program performed maintenance on more than 12,800 roadside trees and planted more than 1,700 new street trees in FY 16. Further, trees have important roles in many other programs, including stream restoration, green streets, and maintenance of stormwater management facilities. Information and guidance about trees is available on many webpages maintained by these programs.

Tree Montgomery

The Office continues to implement and improve the Tree Montgomery program. It is a comprehensive program to plant and establish shade trees, increase awareness and long-term
care of trees, and provide data management and mapping tools to track plantings across Montgomery County.

Shade tree plantings through Tree Montgomery are funded through fees paid as mitigation for activities regulated by the Tree Canopy Law. When development is subject to the Tree Canopy Law, it requires shade trees to be planted. The number of shade trees to be planted is based on the size, or area, of the disturbance created by the development activity. If the required shade trees are not planted for any reason, fees are paid into a dedicated Tree Canopy Account. By law, funds in this Tree Canopy Account can only be used to plant and establish shade trees.

In general, the Tree Canopy Law applies to development activity not subject to mitigation under the County’s Forest Conservation Law. As a result, small developers and custom home builders in Montgomery County contribute a substantial portion of the funds deposited into the dedicated Tree Canopy Account.

The funds in the Account are used by Tree Montgomery to install and establish shade trees on private property in Montgomery County for free. At the end of FY16, more than $1,263,000 had been paid into the Tree Canopy Account, with $724,000 deposited in FY16. The cumulative appropriations (amounts authorized in the budget) amount to $1,150,000, all of which has been encumbered into a tree planting contract, and $596,000 has been paid for shade trees and aftercare as of March 1, 2017.

The Tree Canopy Law stipulates that shade trees can only be installed through the fall, winter, and early spring, between October 15th and April 30th. During the first planting season of Tree Montgomery, 47 shade trees were installed, approved, and invoiced in the spring of 2015. In the second planting season, the fall and winter of 2015-2016, 456 shade trees were installed, approved, and invoiced. In the current planting season, the fall and winter of 2016-2017, 582 shade trees were installed, approved, and invoiced before March 1st with additional plantings planned for March and April, 2017.

The 456 trees reported as planted in the 2015-2016 planting season is less than the number of trees reported as planted during this period in last year’s annual report on the Montgomery County Tree Canopy Law; the figure reported in that report was 485 trees. The difference results from a refinement to the data management process for the program (see discussion that follows in the section entitled Data and Mapping). In this and all future reports regarding Tree Montgomery, the number of trees planted will be based on trees installed, approved, and invoiced as noted above. The figure reported last year included some trees ordered or installed but determined to be unacceptable, and therefore not invoiced as anticipated, due to a variety of reasons (e.g., incorrect species, poor quality trees, etc.). Reporting only trees that are
invoiced will allow for consistent reporting and a closer relationship between the number of trees planted and the actual cost to plant them.

While applications for shade tree plantings were largely processed in the order they were received prior to this year, the requests and plantings were concentrated in the highly urban areas of Montgomery County. Starting in fall 2017, priority was given to applications for shade trees from areas with high concentrations of development subject to the Law.

As in past years, the Office met with each applicant for shade trees through Tree Montgomery to jointly select appropriate planting locations and species, answer questions and provide advice about long-term care. For all trees planted since the program began, 59 percent were planted on single family properties, 33 percent at multi-family communities and open space in HOAs, with the remaining planted at religious and non-profit organizations. Thirty-eight different species of shade trees have been planted and 90 percent of all shade trees installed were native to the Piedmont of Montgomery County. All trees are protected from damage by deer. A majority of these newly planted trees will receive two years of aftercare including watering, structural pruning, mulching, and weeding; all at no cost to the property owners.

The Office continues to work in collaboration with the development and environmental communities on further opportunities to increase planting of trees. Additionally, the Office is working with the Department of General Services and Montgomery County Public Schools to increase canopy by planting shade trees on public facilities. This will also provide outreach and educational opportunities to promote tree plantings and long term care.

More information and data about the Tree Montgomery planting program will be included in the annual report required by the Tree Canopy Law. This report will be submitted by the Office of Sustainability in spring 2017.
Education and Outreach

The Office continues to use and develop a robust outreach and education campaign. This is essential to tree canopy planting programs, as well as the overall goals related to retaining and caring for existing trees. In conjunction with communications consultants, the Office developed a detailed framework for a new website covering information such as the benefits of shade trees, other planting programs available in Montgomery County, and an interactive map. The new website is targeted to launch in the summer of 2017.

Data and Mapping

To streamline the Tree Montgomery program, automated processes for many aspects of the program were developed, implemented, and revised during in the past year. These processes include improving the on-line application and signature process for the access agreements needed to conduct planting and maintenance activities on private property. Additionally, progress was made towards automating and streamlining data management and communications tasks across the program. These tasks include mapping locations for plantings; managing applications, invoices, and budgets; informing applicants of their progress; placing orders; coordinating with the planting contractor; and conducting post-planting inspections. For example, staff approves applications for trees, converts them to orders and invoices, maps planting locations, and adds inspection results within one database. Further, the tree planting contractor receives orders, tasks, and corrections; as well as provides dates of installation and corrections through the automated data management system. This database is accessible to staff and the contractor from any electronic device with connection to the internet.

A public-facing map has been developed to show all newly planted trees through Tree Montgomery and those planted to meet the requirements of the Tree Canopy Law. Currently, this map is available through Data Montgomery and will be included on the Tree Montgomery website. This will allow any interested party to follow the progress of plantings in the County.

Finally, the Office continues to work with the Department of Permitting Services to obtain information about the location and species of the trees planted by during development activity subject to the Tree Canopy Law.
Green Business Certification Program

The Green Business Certification Program, a partnership between the Office and the Montgomery County Chamber of Commerce, is a voluntary recognition and education program whose mission is to:

- Empower businesses and other organizations to green their operations through tools, incentives, inspirational ideas, collaboration, and leadership opportunities; and
- Encourage local consumers and other businesses to consider Certified Green Businesses when making purchasing decisions.

The “umbrella” program recognizes businesses certified through several robust standards applicable to a wide range of commercial sectors. These standards include the following:

- Montgomery County Department of Environmental Protection
  - Office Based Businesses
  - Landscape Businesses
- Green Seal
  - Residential Cleaning Services
  - Commercial Cleaning Services
Veriflora ® Sustainably Grown and ISO 14001 were new to this list in late 2016. Program recognition of the Veriflora ® Sustainably Grown standard, for cut flower and potted plant producers, welcomed in Bell Nursery, the mid-Atlantic region’s largest wholesale nursery grower.

The ISO 14001 standard, which specifies requirements for an “environmental management system” – a set of processes for systematically managing, measuring and improving environmental performance – ushered in Fitzgerald Auto Mall, the only car dealership in the nation with this achievement; the Coca-Cola Bottling Co. Consolidated Production Facility in Silver Spring; and the Montgomery County Yard Trim Composting Facility, one of only two such facilities in the nation to meet this standard.

Spark: Individual Actions, Collective Impact

The Green Business Program also ventured into new social media territory by piloting, with interested Certified Green Businesses, an online employee engagement platform to encourage employees to green their workplace and daily lives. The platform, hosted by WeSpire and branded as “Spark: Individual Actions, Collective Impact,” organizes participating businesses into “competing” teams, each vying to “out green” the another. The initiative raises awareness of environmental issues while empowering employees to take individual actions and, while at it, have fun.

But the platform also helps businesses to measure its employees’ collective impact through an environmental impact and cost savings calculator that aggregates employee accomplishments. To date, there are 225 registered users who have completed over 2,800 individual actions. Collectively, these actions have avoided generating 61 trash cans.
of waste and 13,640 pounds of carbon dioxide, and saved nearly $3,000. The pilot, which ends in mid-July, will be evaluated later this year.

Building Awareness of B Lab Certification and Measurement Tools

One of the most rigorous standards recognized by the Green Business Certification Program is B Lab certification. Certification requires, among other things, that a business embed a commitment to society and the environment into its governing documents. Although a profit-making entity, a certified “B Corp” uses the power of business to help solve environmental and societal problems, not just minimize its adverse impacts. Thus, encouraging County businesses to pursue B Lab certification is a priority for the Green Business Certification Program.

To this end, the Program partnered with the B Local Mid Atlantic group to hold a B Corps “summit” at the Silver Spring Civic Building, with featured guest then State Senator Jamie Raskin (now a member of the U.S. House of Representatives), to raise awareness of B Lab certification and highlight the value B Corps bring to their community, the environment, and employees.

The Green Business Certification Program also supports Bethesda Green’s Be Impact Initiative which helps businesses begin the process of measuring their social and environmental impact through B Lab’s comprehensive online assessment tool. This allows businesses to benchmark their efforts against other businesses around the nation to identify areas of improvement.

State Senator Jamie Raskin (now of the U.S. House of Representatives) with Sophia Maroon, CEO and Founder of Dress it up Dressing, a Certified B Corp

Kim Goddu of Bethesda Green at the kick off meeting for the Be Impact Initiative
Leadership and Recognition

This year a number of Certified Green Businesses were recognized publicly at large Montgomery County Chamber of Commerce events and used their platform to convey the value of sustainability to the business community. Bell Nursery, which received the Visionary of the Year Award at the Chamber’s Annual Dinner, took the opportunity to raise awareness of the plight of the Monarch Butterfly and distributed 700 milkweed plants, the Monarch’s sole food plant, to attending guests so that they could plant this food source in their yards and help this iconic species. MedImmune/AstraZeneca, which received the Green Business Innovator of the Year Award, highlighted its goals to reduce energy consumption by 25% by 2020, and build on its recent accomplishment, a zero-waste café, to achieve a recycling rate of 70%. United Solutions, won the Spirit of Free Enterprise award, citing the importance of partnerships with Montgomery College and the Montgomery County Public School system.

Program Evolution and Growth

At the end of FY16 (June 30, 2016) there were 76 Certified Green Businesses, down from 83 at the end of FY15. Despite evolution to an umbrella program over the last couple of years, and the resulting expansion of eligibility, FY16 marked the first year since the Program’s 2010 launch in which attrition exceeded growth.

Since 2010, 25 organizations have dropped out of the program with more than half of this attrition occurring in FY16. It is difficult to assess precisely why some businesses are not choosing to recertify, which is every three years, although there are a few factors that partially explain the decline. Six of the organizations are simply no longer eligible as they have gone out of business, moved out of the County, or become virtual companies; eight others were acquired...
by another business or are under new management; seven indicated that it was either too demanding or required too much time; and four did not disclose their reasoning.

Most of the attrition has been from businesses certified through DEP’s “home grown” checklist which, since its revision in 2015, has become more challenging to achieve. For example, new requirements have been added such as continuous improvement and performance measurement to ensure that businesses fully embed sustainability into their strategic plans. While the Office believes these requirements are important because they create a higher level of accountability and commitment, the changes clearly require more time and effort on the part of businesses.

Looking ahead, the Office intends to maintain the high bar of achievement so that the Green Business Certification Program reflects the County’s top tier corporate sustainability leaders. However, the Office also aims to broaden its reach to businesses not necessarily interested in, or ready to pursue, certification. Plans for consolidating resources and programs under a broad-based “Green Business Program,” in which the “Green Business Certification Program” will be just one component, are in the early conceptual stage.

David Nguyen, CEO and Founder, United Solutions (right), receiving the Montgomery County Chamber of Commerce Spirit of Free Enterprise Award
Outreach and Education

While the Office has dedicated outreach staff, the Office believes that engaging community members and connecting our message to the public is the responsibility of every team member. The staff who have outreach and education in their title both lead their own programs as well as serve as support to the people and programs within the Office of Sustainability as well as DEP as a whole. Their work is interwoven throughout this report, especially in supporting energy, trees and community greening. When it comes to outreach and education, the Office truly believes in all hands-on deck.

My Green Montgomery

My Green Montgomery (MyGreenMontgomery.org) is a service to help County residents and businesses discover and share stories, ideas and resources for living a greener, more sustainable life in an economically vibrant community. Since its launch in 2012, the website has become a one-stop site for finding the latest green community events, financial incentives, suggestions of “do-it-yourself” projects,
as well as green news and tips. The community blog is the most visited part of My Green Montgomery and features stories by community members, County employees, non-profits and businesses.

My Green Montgomery also serves as a communication brand of the Office and DEP as a whole, and is one way people engage with DEP through social media.

The My Green Montgomery Website

The site had 43,383 unique pageviews in 2016, representing a 23% increase over 2015. The most visited pages were the green projects search, the blog, the calendar and an article on the importance of Green Streets.

Blogs and Newsletter

My Green Montgomery featured 79 blog posts in 2016. Thirty-five of the stories were written by guest writers or a contractor on topics ranging from solar energy technology to the importance of trees.

The top viewed stories of 2016 includes:
- Green Streets drive runoff in the right direction
- Greenbriar Local Park opening
- Join the Montgomery County Solar Co-op
- The 3rd annual Montgomery County Energy Summit
- Monarch butterflies gain an ally as Bell Nursery brings milkweed to County residents

Staff of Family & Nursing Care, a certified green business, were featured in a My Green Montgomery blog.
The “Your Green Montgomery” e-newsletter is a monthly digest of the new blog stories and highlighted programs of the Office, other programs within DEP, and our partners. At the end of 2016, the newsletter had 2,516 subscribers, an 85% increase over 2015. The newsletter also had 33.26% average open rate for the year, which exceeds the average open rate of 26% for government newsletters according to a MailChimp.com review.

Social Media

In 2016, the My Green Montgomery social media sites continued to grow.

- Twitter: @MyGreenMC has 1,181 followers, a 40.9% increase over 2015
- Facebook: @MyGreenMontgomery has 851 likes, a 40.1% increase over 2015
- Instagram: @MyGreenMC has 112 followers, a 57.7% increase over 2015
- My Green Montgomery also maintains a Pinterest board of 385 pins on 9 boards, 7,311 photos on Flickr and 63 videos on the YouTube channel.

Events

Montgomery County GreenFest

The annual Montgomery County GreenFest is quickly becoming one of the signature events of the Department, the County and environmental groups across the area. In its second year, the event experienced tremendous growth in attendance as well as recognition in the community.

The 2016 Montgomery County GreenFest occurred on Saturday, April 30th at the Takoma Park Community Center in the city of Takoma Park. More than 1,200 people were estimated to have attended the event, which represents more than a 70% increase over the previous year.

The day kicked off with a keynote address by EPA Administrator Gina McCarthy. Also on the stage was County Executive Isiah Leggett and members of the Montgomery County Council, State Senator Jamie Raskin, Mayor of Takoma Park Kate Stewart, and Department of Environmental Protection Director Lisa Feldt.
Administrator McCarthy gave an empowering speech about the importance of work at the local level, culminating in the line “What starts in Montgomery County, can’t stay in Montgomery County.”

Additional highlights of the day included:

- Speakers, panels, and DIY workshops on topics ranging from green investing to raising backyard chickens
- Local musicians and dance troupes on our outdoor stage
- A screening of the documentary *E.O. Wilson: Of Ants and Men*, courtesy of the Environmental Film Festival in the Nation’s Capital
- Tree climbing with Montgomery Parks
- A variety of cars displayed in the Electric Vehicle and Car Show
- Arts and crafts for the kids, including a greeting card craft with the Silver Spring Timebank
- Photography lessons in the local park
- More than 80 vendors and exhibitors

The event was organized as part of a public-private partnership between the Montgomery County Government, Washington Suburban Sanitary Commission, Montgomery Parks, the cities of Takoma Park, Gaithersburg and Rockville, Montgomery College, the Montgomery County Public School’s Outdoor Environmental Education Program, University of Maryland Extension, and local nonprofits, Bethesda Green, Green Wheaton, Silver Spring Green and Poolesville Green.

The 3rd annual GreenFest will be Saturday, May 6, 2017 at Bohrer Park in the city of Gaithersburg from 11am – 4pm.
County Fair

For 2016, the Office partnered with DEP’s Divisions of Watershed Management and Solid Waste Services to educate the public during the weeklong Montgomery County Agricultural Fair. Topics and activities included:

- Steps to take to address residential energy efficiency
- Planting a tree through Tree Montgomery
- Methods for controlling stormwater
- The County’s 70% recycling goal
- Backyard composting
- Bag Law education and littering prevention
- Distribution of seed packet, reusable bags, and radon test devices

DEP staff engaged with 7,559 people during the week of the Fair.

PARK(ing) Day

International PARK(ing) Day is an annual worldwide event where artists, designers and citizens transform metered parking spots into temporary public parks. The goal of the event is to have people rethink our concrete environment and transportation choices, as well as bring green spaces to unexpected places. This was the first year that DEP participated in PARK(ing) Day.
The Office partnered with staff from the Division of Watershed Management, as well as Mid-County Regional Services Center and the nonprofit, Green Wheaton, to bring PARK(ing) Day to downtown Wheaton. There were hundreds of native plants surrounding a bench made from recycled palettes. The display also had activities for kids, including stream wildlife, a model of a green street bioretention, and free ice cream. More than 150 people visited the public display.

Our PARK(ing) Day display would not have been possible without the support of the Department of Transportation, which organized the County-wide celebration, as well as, Montgomery Parks, which supplied the plants.

General Events

Other events attended by Office staff included Bike to Work Day, the Greenbriar Local Park opening, Arbor Day and Earth Day celebrations, World of Montgomery and civic association and community green meetings. In addition, Office staff also participated in various events sponsored by the Divisions of Watershed Management and Solid Waste Services, supplementing their outreach related to stormwater management and recycling.

“One DEP” Initiative

Office staff have been part of a larger “One DEP” initiative within DEP designed to enhance the department’s outreach and communication activities and, ultimately, the impact of the department’s programs and services. DEP is made up of nearly 200 engineering, scientific, financial, and administrative professionals, many with very specialized training and experience in a particular subject area. Every employee is also a representative of the department (and the County government), and has the opportunity to interact with the public in a variety of ways. Often, residents or businesses interested in increasing their level of recycling or reducing their energy use are also interested in planting a tree or more effectively managing their stormwater.
The goal of the “One DEP” initiative is to enable staff at all levels, and within all parts, of the department to serve as “ambassadors” for the full range of programs and services DEP provides to the residents and businesses in Montgomery County. In 2016, the initiative resulted in:

1. the development of a brochure that encompasses all of DEP’s work;
2. the integration of DEP’s messaging around clean land, air, and water at GreenFest and the County Fair; and
3. a “One DEP” webinar for property managers.
As noted in the Introduction, section 18A-13 of the Montgomery County Code specifies that the Office of Sustainability must:

- Annually report actions taken to implement the CPP, and progress toward meeting the greenhouse gas reduction goals in the CPP
- Evaluate options for a broader Countywide sustainability reporting framework
- Apply a scoring system every two years designed to compare the County to other local jurisdictions on energy efficiency policies and programs

The 2016 Office of Sustainability Annual Report highlighted how these requirements are integrally related, and introduced the STAR Community Rating System as an ideal tool to meet all of these objectives. STAR stands for “Sustainability Tools for Assessing and Rating.” As the acronym suggests, the STAR Community Rating System (hereinafter referred to as STAR) provides communities with “a roadmap to help evaluate, assess, and improve communities’ economic, environmental, and social performance measures and become healthier, stronger, and more resilient.” Moreover, STAR helps local government and the community at large to integrate and leverage cross-cutting initiatives to create shared goals and accountability.

As illustrated in the Figure 3-1, STAR is based on an assessment of eight Goals, which were recently revised. Within each Goal are a set of Objectives; there are a total of 49 objectives across the eight Goals. Each of the Objectives has a series of related actions and outcome measures guiding sustainability performance.

In addition to being a framework that guides sustainability performance, STAR is also a certification and recognition program. With support from the County Executive’s office, the Office is working closely with CountyStat, the County’s performance management and data analytics organization, to pursue certification. Collectively, the Office and CountyStat are engaging County departments (starting with the Departments of General Services, Transportation, Health and Human Services, and Housing & Community Affairs) and agencies to explain the framework’s benefits and collect data and information needed for certification.

While STAR certification provides a valuable platform for national recognition in sustainability, the process can provide great value after certification. STAR’s benchmarking and performance measurement features can illuminate new opportunities and areas for improvement. This, in turn, can inform program and policy priorities as well as areas to focus on in annual reporting. The County is targeting late 2017 for submission of a certification application.
## Figure 3-1

**STAR Community Rating System**

**Goals & Objectives**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ambient Noise &amp; Light</td>
<td>Climate Adaptation</td>
<td>Business Retention &amp; Development</td>
<td>Arts &amp; Culture</td>
<td>Civic Engagement</td>
<td>Active Living</td>
<td>Green Infrastructure</td>
<td>Best Practices &amp; Processes</td>
</tr>
<tr>
<td>Community Water Systems</td>
<td>Greenhouse Gas Mitigation</td>
<td>Green Market Development</td>
<td>Community Cohesion</td>
<td>Civil &amp; Human Rights</td>
<td>Community Health</td>
<td>Biodiversity &amp; Invasive Species</td>
<td>Exemplary Performance</td>
</tr>
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<td>Compact &amp; Complete Communities</td>
<td>Greening the Energy Supply</td>
<td>Local Economy</td>
<td>Educational Opportunity &amp; Attainment</td>
<td>Environmental Justice</td>
<td>Emergency Management &amp; Response</td>
<td>Natural Resource Protection</td>
<td>Local Innovation</td>
</tr>
<tr>
<td>Public Parkland</td>
<td>Local Government GHG &amp; Resource Footprint</td>
<td>Workforce Readiness</td>
<td>Aging in the Community</td>
<td>Poverty Prevention &amp; Alleviation</td>
<td>Hazard Mitigation</td>
<td>Working Lands</td>
<td></td>
</tr>
<tr>
<td>Transportation Choices</td>
<td>Waste Minimization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safe Communities</td>
<td></td>
</tr>
</tbody>
</table>
Other sections of this report highlight the many programs and activities undertaken by the Office of Sustainability, other County government departments and agencies, non-profit organizations, and residents and businesses in the County. This section provides some metrics to demonstrate the effect of these activities, and the progress the County is making toward meeting its climate change and other sustainability goals.

The metrics presented here do not provide the full picture of the County’s progress. Although many key measures are presented, developing a complete set of sustainability metrics will be an evolving process, and require inputs from a wider variety of entities. The *Benchmarking Sustainability* section discussed how the County will utilize the STAR Community Rating System to broaden the County’s measurement and tracking of sustainability.

**Building Fuel Energy Use**

The CPP established targets for reductions in building energy use for the residential and commercial/multi-family sectors. For the residential sector, the plan called for steps to be taken to encourage 50% of the County’s homeowners to take steps to reduce energy use by 25% by 2020. In the commercial/multi-family sector, the target was a total reduction of 25% by 2020 across the sector.

Information on building energy use in the County is available from data collected through the County’s fuel energy tax, which provides information on the consumption of electricity, natural gas, and other building fuels. These data are broken out by residential and non-residential use, based on the structure of the County’s energy tax and the nature of utility tariffs from electricity and gas suppliers. Generally, larger multi-family properties are included in the non-residential data.

Building fuel energy use and greenhouse gas emission data are presented on a fiscal year basis. (The County’s fiscal year is from July 1 to June 30.) During the compilation of FY16 data, errors were discovered in the FY15 data as a result of the double counting of some energy tax reporting periods. These errors resulted in an overstatement of total FY15 building energy use in the Office’s 2016 Annual Report of approximately 6%. This error has been corrected in the FY15 figures included in this year’s report.

Residential building energy use is shown in Figures 4-1 and 4-2. Residential building energy use dropped to its lowest level since FY12 in FY16, and overall was more than 12% less than the FY05 base year.
Non-residential building energy use is shown in Figures 4-3 and 4-4. Non-residential energy, which exhibits less volatility than residential use, was nearly equivalent in FY16 to the FY05 base year. Like residential building energy use, non-residential building energy use also reached its lowest point in FY16 since FY12. In total, building related energy use has dropped nearly 7% from the FY05 base year.

Determining the reasons for fluctuations in building energy use is complex. Energy use may be influenced by, among other things, economic activity, weather, and fuel prices. It’s also important to note that the data show total energy use in the building sector and is not adjusted to reflect increases in population or building square footage.

**Greenhouse Gas Emissions**

The 2009 Montgomery County Climate Protection Plan established the following goals for greenhouse gas (GHG) reductions:

“...reduce County wide greenhouse gas emissions to 80% below the amount...in the base year [FY05]...including a plan to stop increasing County wide greenhouse gas emissions by 2010 and achieve a 10% reduction every 5 years through 2050.”

The three primary components of the County’s measured GHG emissions were residential and non-residential building energy use, and on-road transportation. The Office of Sustainability continues to work toward a standard approach for regularly updating transportation related GHG emissions, coordinating this effort with the Metropolitan Washington Council of Governments and other jurisdictions in the region that measure transportation related GHG emissions in an attempt to maintain a common process.

Information from the County’s fuel energy tax provides the raw data for calculating GHG emissions from building related energy use. Utilizing factors established by the U.S. Environmental Protection Agency (USEPA), data on energy consumption can be converted to GHG emissions. In keeping with standard protocols, these emissions are expressed in terms of carbon dioxide equivalents (CO2e) to account for the global warming potential of other greenhouse gases (methane and nitrous oxide) emitted when electricity is generated or other building fuels are consumed.

As noted in the 2016 Annual Report, the Office of Sustainability updated the calculated base year (FY05) GHG emissions associated with building energy use last year, so the FY05 baseline figure for GHG emissions from building energy use was 7.205 million metric tons CO2e (MMTCO2e).
Building-related GHG emissions are shown in Figures 4-5 and 4-6. In FY16, GHG emissions from building fuel use are down by more than 23% from the FY05 base year. Therefore, this component of the County’s measured GHG emissions has met the target of a 10% reduction by FY15, and is well ahead of the goal of a 20% reduction by 2020.

While total building energy use has dropped by just under 7% since the FY05 base year, the reduction in GHG emissions from buildings is primarily attributable to the greening of the electricity supply. As shown in Figure 4-7, the average GHG emissions from the electricity supplied to this region have dropped from 1,145 lbs/MWh CO2e to 858 lbs/MWh CO2e, a reduction of more than 25%. This information is compiled in the U.S. EPA’s Emissions & Generation Resource Integrated Database (eGRID), which is a comprehensive source of data on the environmental characteristics of the nation’s electric power generation system. The data from eGRID is aggregated in a variety of ways. The emissions factors in Figure 4-7 are from the eGRID subregion identified as “RFC East,” which is the eastern half of the region managed by Reliability First, one of eight regional entities responsible for ensuring the reliability of the nation’s electric power system. Data are not available from eGRID for each year. As a result, in this analysis, GHG emissions from electricity use in a given year are based on the most recent year for which data is available (e.g., emissions for FY14-FY16 are based on 2014 emissions factors). Should updated eGRID emissions data become available for recent years, the County’s GHG emissions from building energy use may change from that shown in Figures 4-5 and 4-6.

Several points should be noted related to the GHG emissions data. First, the calculated emissions are based on emission factors associated with the combustion of the fuels used to generate the energy. For electricity, this means the emissions at the power plant; for natural gas, LPG, and heating oils, this means at the building where the fuel is used. Line losses in the electric distribution system, fugitive emissions due to the extraction of natural gas and oil, and other indirect emissions are not included in this analysis.

Second, because Maryland is a deregulated electricity market, consumers may obtain their electricity supply from an entity other than their local utility. A number of suppliers offer “green” power, that is, power generated by wind, solar, or another clean, renewable source. The County does not have access to data on how many customers may be using some form of clean electricity. As a result, the actual GHG emissions associated with the electricity used by Montgomery County customers may be higher (or lower) than the calculated emissions if County customers purchase a lesser (or greater) amount of clean electricity than the average customer in the RFC East eGRID subregion.
Residential building energy use dropped to its lowest level since FY12 in FY16, and overall was more than 12% less than the FY05 base year.
### Building Fuel Energy Use
#### Residential

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<thead>
<tr>
<th></th>
<th>Electricity (KWh)</th>
<th>Gas (Therm)</th>
<th>LPG (Pounds)</th>
<th>No. 1 (Gallons)</th>
<th>No. 2 (Gallons)</th>
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</thead>
<tbody>
<tr>
<td>FY05</td>
<td>4,650,365,354</td>
<td>210,947,321</td>
<td>11,323,344</td>
<td>43,305</td>
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<td>FY06</td>
<td>4,875,934,157</td>
<td>190,385,482</td>
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<td>34,586</td>
<td>10,708,490</td>
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<td>FY07</td>
<td>4,888,000,090</td>
<td>178,561,097</td>
<td>13,230,472</td>
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<td>4,740,868,534</td>
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<td>4,588,119,300</td>
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<th></th>
<th>Electricity (MMBtu)</th>
<th>Gas (MMBtu)</th>
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<th>No. 1 (MMBtu)</th>
<th>No. 2 (MMBtu)</th>
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<td>15,867,047</td>
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<td>937,778</td>
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Figure 4-3

Non-residential energy was nearly equivalent in FY16 to the FY05 base year. Like residential building energy use, non-residential building energy use also reached its lowest point in FY16 since FY12.

Source: Montgomery County Fuel Energy Tax Data
## SUSTAINABILITY METRICS

### Figure 4-4

#### Building Fuel Energy Use

**Non-Residential**

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity (KWh)</th>
<th>Gas (Therms)</th>
<th>LPG (Pounds)</th>
<th>No. 1 (Gallons)</th>
<th>No. 2 (Gallons)</th>
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</thead>
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<td>5,383,935,207</td>
<td>120,335,381</td>
<td>6,245,318</td>
<td>176,168</td>
<td>8,070,670</td>
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<td>FY07</td>
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<td>5,241,570</td>
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<tr>
<td>FY10</td>
<td>5,527,912,879</td>
<td>131,562,194</td>
<td>4,239,639</td>
<td>66,127</td>
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</tr>
<tr>
<td>FY11</td>
<td>5,363,937,023</td>
<td>135,335,381</td>
<td>4,195,407</td>
<td>102,294</td>
<td>5,842,986</td>
</tr>
<tr>
<td>FY12</td>
<td>5,454,742,214</td>
<td>123,355,584</td>
<td>2,692,220</td>
<td>9,179</td>
<td>4,194,417</td>
</tr>
<tr>
<td>FY13</td>
<td>5,122,496,129</td>
<td>140,694,168</td>
<td>2,571,274</td>
<td>0</td>
<td>2,396,099</td>
</tr>
<tr>
<td>FY14</td>
<td>5,379,664,759</td>
<td>145,252,440</td>
<td>3,891,392</td>
<td>104,679</td>
<td>2,982,058</td>
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<tr>
<td>FY15</td>
<td>5,167,612,553</td>
<td>152,202,425</td>
<td>4,125,457</td>
<td>22,423</td>
<td>2,695,111</td>
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<tr>
<td>FY16</td>
<td>5,208,698,013</td>
<td>135,346,635</td>
<td>2,594,050</td>
<td>605</td>
<td>2,239,122</td>
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</table>

#### Fuel Energy Use

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity (MMBtu)</th>
<th>Gas (MMBtu)</th>
<th>LPG (MMBtu)</th>
<th>No. 1 (MMBtu)</th>
<th>No. 2 (MMBtu)</th>
<th>Total (MMBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY05</td>
<td>18,369,987</td>
<td>12,033,538</td>
<td>135,261</td>
<td>24,487</td>
<td>1,113,752</td>
<td>31,677,026</td>
</tr>
<tr>
<td>FY06</td>
<td>19,210,993</td>
<td>11,869,589</td>
<td>115,766</td>
<td>14,548</td>
<td>954,989</td>
<td>32,165,985</td>
</tr>
<tr>
<td>FY07</td>
<td>19,418,429</td>
<td>12,169,053</td>
<td>107,881</td>
<td>16,239</td>
<td>838,689</td>
<td>32,550,292</td>
</tr>
<tr>
<td>FY08</td>
<td>19,225,452</td>
<td>12,680,905</td>
<td>137,033</td>
<td>12,439</td>
<td>929,462</td>
<td>32,985,290</td>
</tr>
<tr>
<td>FY09</td>
<td>19,128,628</td>
<td>13,661,903</td>
<td>102,346</td>
<td>3,232</td>
<td>723,337</td>
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<tr>
<td>FY10</td>
<td>18,861,239</td>
<td>13,156,219</td>
<td>91,822</td>
<td>9,192</td>
<td>949,944</td>
<td>33,058,416</td>
</tr>
<tr>
<td>FY11</td>
<td>18,301,753</td>
<td>13,533,538</td>
<td>90,864</td>
<td>14,217</td>
<td>806,332</td>
<td>32,746,705</td>
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<td>18,611,580</td>
<td>12,355,558</td>
<td>58,308</td>
<td>1,276</td>
<td>578,829</td>
<td>31,585,552</td>
</tr>
<tr>
<td>FY13</td>
<td>17,477,957</td>
<td>14,069,417</td>
<td>55,689</td>
<td>0</td>
<td>330,662</td>
<td>31,933,724</td>
</tr>
<tr>
<td>FY14</td>
<td>18,355,416</td>
<td>14,525,244</td>
<td>84,280</td>
<td>14,550</td>
<td>411,524</td>
<td>33,391,014</td>
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<tr>
<td>FY15</td>
<td>17,631,894</td>
<td>15,220,243</td>
<td>89,349</td>
<td>3,117</td>
<td>371,925</td>
<td>32,316,528</td>
</tr>
<tr>
<td>FY16</td>
<td>17,772,078</td>
<td>13,524,664</td>
<td>56,182</td>
<td>84</td>
<td>308,999</td>
<td>31,672,006</td>
</tr>
</tbody>
</table>
In FY16, building-related GHG emissions were down by more than 23% from the FY05 base year. This component of the County’s measured GHG emissions has met the target of a 10% reduction by FY15, and is well ahead of the goal of a 20% reduction by 2020.
# SUSTAINABILITY METRICS

## Residential Building-Related GHG Emissions

<table>
<thead>
<tr>
<th></th>
<th>Electricity (MMTCO2e)</th>
<th>Gas (MMTCO2e)</th>
<th>LPG (MMTCO2e)</th>
<th>No. 1 (MMTCO2e)</th>
<th>No. 2 (MMTCO2e)</th>
<th>Total (MMBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY05</td>
<td>2.416</td>
<td>1.120</td>
<td>0.015</td>
<td>0.000</td>
<td>0.123</td>
<td>3.678</td>
</tr>
<tr>
<td>FY06</td>
<td>2.533</td>
<td>1.011</td>
<td>0.014</td>
<td>0.000</td>
<td>0.110</td>
<td>3.669</td>
</tr>
<tr>
<td>FY07</td>
<td>2.361</td>
<td>0.948</td>
<td>0.018</td>
<td>0.000</td>
<td>0.099</td>
<td>3.427</td>
</tr>
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<td>FY08</td>
<td>2.290</td>
<td>1.038</td>
<td>0.016</td>
<td>0.000</td>
<td>0.088</td>
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<td>2.030</td>
<td>1.121</td>
<td>0.014</td>
<td>0.000</td>
<td>0.097</td>
<td>3.263</td>
</tr>
<tr>
<td>FY10</td>
<td>2.096</td>
<td>1.080</td>
<td>0.013</td>
<td>0.000</td>
<td>0.096</td>
<td>3.285</td>
</tr>
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<td>FY11</td>
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<td>1.125</td>
<td>0.014</td>
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<td>3.312</td>
</tr>
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<td>FY12</td>
<td>1.737</td>
<td>0.897</td>
<td>0.009</td>
<td>0.000</td>
<td>0.069</td>
<td>2.712</td>
</tr>
<tr>
<td>FY13</td>
<td>1.726</td>
<td>1.091</td>
<td>0.010</td>
<td>0.000</td>
<td>0.033</td>
<td>2.960</td>
</tr>
<tr>
<td>FY14</td>
<td>1.807</td>
<td>1.217</td>
<td>0.011</td>
<td>0.000</td>
<td>0.094</td>
<td>3.129</td>
</tr>
<tr>
<td>FY15</td>
<td>1.772</td>
<td>1.213</td>
<td>0.011</td>
<td>0.000</td>
<td>0.088</td>
<td>3.084</td>
</tr>
<tr>
<td>FY16</td>
<td>1.685</td>
<td>0.969</td>
<td>0.009</td>
<td>0.000</td>
<td>0.070</td>
<td>2.733</td>
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</table>

## Non-Residential Building-Related GHG Emissions

<table>
<thead>
<tr>
<th></th>
<th>Electricity (MMTCO2e)</th>
<th>Gas (MMTCO2e)</th>
<th>LPG (MMTCO2e)</th>
<th>No. 1 (MMTCO2e)</th>
<th>No. 2 (MMTCO2e)</th>
<th>Total (MMBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY05</td>
<td>2.797</td>
<td>0.639</td>
<td>0.009</td>
<td>0.002</td>
<td>0.083</td>
<td>3.529</td>
</tr>
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<td>FY06</td>
<td>2.925</td>
<td>0.630</td>
<td>0.007</td>
<td>0.001</td>
<td>0.071</td>
<td>3.635</td>
</tr>
<tr>
<td>FY07</td>
<td>2.749</td>
<td>0.646</td>
<td>0.007</td>
<td>0.001</td>
<td>0.062</td>
<td>3.466</td>
</tr>
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<td>0.009</td>
<td>0.001</td>
<td>0.069</td>
<td>3.474</td>
</tr>
<tr>
<td>FY09</td>
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<td>0.726</td>
<td>0.006</td>
<td>0.000</td>
<td>0.054</td>
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</tr>
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<td>FY10</td>
<td>2.525</td>
<td>0.699</td>
<td>0.006</td>
<td>0.001</td>
<td>0.070</td>
<td>3.301</td>
</tr>
<tr>
<td>FY11</td>
<td>2.450</td>
<td>0.719</td>
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<td>0.001</td>
<td>0.060</td>
<td>3.235</td>
</tr>
<tr>
<td>FY12</td>
<td>2.134</td>
<td>0.655</td>
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<td>0.000</td>
<td>0.043</td>
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</tr>
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<td>0.004</td>
<td>0.000</td>
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<td>0.772</td>
<td>0.005</td>
<td>0.001</td>
<td>0.031</td>
<td>2.902</td>
</tr>
<tr>
<td>FY15</td>
<td>2.012</td>
<td>0.808</td>
<td>0.006</td>
<td>0.000</td>
<td>0.028</td>
<td>2.954</td>
</tr>
<tr>
<td>FY16</td>
<td>2.028</td>
<td>0.719</td>
<td>0.004</td>
<td>0.000</td>
<td>0.023</td>
<td>2.773</td>
</tr>
</tbody>
</table>
Figure 4-7

GHG emissions per unit of electricity generated have dropped more than 25% from the FY05 base year. These data are from the U.S. EPA’s Emissions & Generation Resource Integrated Database (eGRID) database, a comprehensive source of data on the environmental characteristics of the nation’s electric power generation system.

Source: http://www.epa.gov/energy/egrid; RFC East eGRID subregion
Sustainable Buildings

Two indicators of a more sustainable building are achieving the ENERGY STAR label from the U.S. EPA or certifying a building through the U.S. Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED) certification process. Montgomery County has more ENERGY STAR labeled and LEED certified buildings than any jurisdiction in Maryland. Figure 4-8 shows the number of buildings in the County achieving the Energy Star label in a given year (the label must be earned each year) and the number achieving LEED building design and construction (BD&C) certification in a given year (LEED BD&C certification is a one-time action). As of January 2017, 213 buildings in Montgomery County had achieved LEED BD&C certification based on USGBC data.

There are different levels of LEED BD&C certification – Certified, Silver, Gold, and Platinum. Figure 4-9 shows the number of buildings achieving each certification level in the County by year since 2004.

Montgomery County Public Schools (MCPS) is one of the largest property managers in the County. Dating back to the adoption of an energy conservation policy in 1973, MCPS has had a history of incorporating sustainability into the design of its schools. Current building design practices include the installation of geoexchange heating/cooling and solar PV systems. All newly constructed schools go through the LEED certification process. Figure 4-10 illustrates the growing number of schools in the MCPS system incorporating one or more of these features.

There has been explosive growth across the country in the installation of on-site solar PV systems. Montgomery County has been no exception. Table 4-11 shows the number of residential permit applications for solar PV systems received by the Office of Permitting Services from FY14 through FY16. Applications for residential systems have grown by nearly 600% from FY14 to FY16.

In 2008, the Maryland General Assembly passed the EmPOWER Maryland Energy Efficiency Act. This legislation directed Maryland’s electric utilities to develop incentives to encourage energy efficiency measures on residential and commercial buildings in the state, with the goal of reducing electricity consumption in the state by 15% by 2015 from a 2007 baseline. Starting in 2009, utilities offered a variety of energy efficiency incentive programs, approved by the Maryland Public Service Commission (PSC) in three year cycles. As Figure 4-12 shows, Pepco’s commercial and industrial customers in the County have utilized more than $100 million of incentives, resulting in an estimated 400,000 MWh of annual energy savings. The significant volume of activity in 2014 was driven primarily by a short-term “fast track” pre-approval process for small business customers and customers taking advantage of substantial incentives.
Activity in 2015 and 2016 was affected by uncertainty over program funding levels pending PSC approval of the 2015-2017 funding cycle, resulting in a temporary freeze on applications in late 2015 through mid-2016.
Figure 4-8

ENERGY STAR data reflects the number of buildings achieving the ENERGY STAR label in a given year; the label must be earned each year. LEED data reflects the number of buildings achieving LEED building design and construction (BD&C) certification in a given year; LEED BD&C certification is a one-time action. As of January 2017, there were 213 LEED certified buildings in Montgomery County.

Source: U.S. Green Building Council; U.S. Environmental Protection Agency - ENERGY STAR; data as of January 2017
LEED data reflects the number of buildings achieving building design and construction (BD&C) certification in a given year; LEED BD&C certification is a one-time action. There are different levels of LEED BD&C certification – Certified, Silver, Gold, and Platinum.
Sustainable features incorporated into Montgomery County Public School buildings include geoexchange heating/cooling and solar PV systems. All newly constructed schools go through the LEED certification process. Of MCPS’s 22 LEED certified schools, 21 are LEED Gold.
Applications for residential solar photovoltaic systems in the County have grown by nearly 600% from FY14 to FY16.
Pepco’s commercial and industrial customers in Montgomery County have utilized more than $100 million of incentives, resulting in an estimated 400,000 MWh of annual energy savings.
Transportation Choices

One hallmark of a sustainable community is a variety of transportation options. Montgomery County is served by an extensive public transportation network, including the Washington Metropolitan Transit Authority’s Metrorail and Metrobus system, and the County’s Ride On bus system. Additional transit options currently under development include the Purple Line and bus rapid transit (BRT). Current development patterns, and infrastructure installed by the private sector and the Department of Transportation, have enhanced the County’s network of sidewalks, bike lanes, and pedestrian and bike paths.

Figure 4-13 illustrates the travel mode split of Montgomery County commuters. According to data from the U.S. Census Bureau, since 2005 the percentage of workers traveling by single-occupancy vehicle has dropped slightly from around 67% to just under 66% in 2015.

Data from the Maryland Motor Vehicle Administration shows there were more than 787,000 vehicles registered in Montgomery County in FY16, which represents an increase of over 12,000 from FY15 and continues a trend since FY11 of steadily increasing vehicle registrations. On a per capita basis, the number of vehicle registrations increased slightly in 2015 (the latest year for which comprehensive vehicle and population data is available) to 0.75 vehicles per person, which is still below the roughly 0.77 vehicles per capita in 2010. As shown in Figure 4-14 the County’s per capita registration rate is similar to Prince George’s County and less than other Maryland counties in the region. As shown in Figure 4-15, alternative vehicles made up just over 3% of the vehicles registered in Montgomery County in FY16, although the total number of alternative vehicles registered dropped from 25,960 in FY15 to 25,440 in FY16. The vast majority of these vehicles were gas/electric hybrid vehicles, although the number of plug-in hybrid electric and electric vehicles registered in FY16 grew by 22% and 49%, respectively. Electric and electric hybrid vehicles are able to charge up at 151 publicly available electric vehicle charging stations as of February 2017, up from 127 in February 2016.

The introduction of Capital Bikeshare into Montgomery County has increased opportunities for biking. There are 66 Bikeshare stations in the County (up from 52 reported in last year’s report), concentrated in the areas around Silver Spring/Takoma Park, Bethesda, and Rockville. As shown in Figure 4-16, since the start of the program in the County, more than 146,000 trips have been taken, totaling more than 354,000 miles.

The Department of Transportation has an extensive capital improvement program to install new sidewalks, replace sidewalks that don’t comply with the Americans with Disabilities Act (ADA), and connect the sidewalk network to bus stops. Figure 4-17 shows the cumulative linear feet of sidewalk installed under this program in the last five years.
According to data from the U.S. Census Bureau, since 2005 the percentage of workers traveling by single-occupancy vehicles has dropped slightly from around 67% to just under 66% in 2015.
Figure 4-14

Data from the Maryland Motor Vehicle Administration shows there were nearly 775,000 vehicles registered in Montgomery County in FY15, the largest number ever. On a per capita basis, the number of vehicle registrations increased slightly in 2015 to 0.75 vehicles per person, which is still below the roughly 0.77 vehicles per capita in 2010.

Alternative vehicles made up just over 3% of the vehicles registered in FY16, although the total number of alternative vehicles registered dropped from 25,960 in FY15 to 25,440 in FY16. The number of registered plug-in hybrid electric and electric vehicles grew by 22% and 49%, respectively. Electric and electric hybrid vehicles are able to charge up at 151 publicly available electric vehicle charging stations.

Source: Maryland Motor Vehicle Administration, FY16 Data

Source: Plugshare, February 2017
The introduction of Capital Bikeshare into Montgomery County has increased opportunities for biking. There are 66 Bikeshare stations in the County (up from 52 reported in last year’s report). Since the start of the program in the County, more than 146,000 trips have been taken, totaling more than 354,000 miles.
The Department of Transportation (DOT) has an extensive capital improvement program to install new sidewalks, replace sidewalks that don’t comply with the Americans with Disabilities Act (ADA), and connect the sidewalk network to bus stops. In the last six years, DOT has installed or replaced more than 50 miles of sidewalk.
Other Sustainability Metrics

As described in detail in section about the Office of Sustainability, the County has a Green Business Certification Program to support and recognize businesses that incorporate sustainability into their operations. The program recognizes businesses certified by B Lab, DEP (under two different programs for offices and landscapers), Green America, the Green Restaurant Association, and Green Seal.

Beginning in FY17, businesses certified by Veriflora, as well as entities that meet the ISO 14001 standard, were also recognized under the County Green Business Certification Program. Figure 4-18 shows breakdown of businesses recognized under these programs through FY16, as well as the number of entities certified under the program since its inception in FY10.

An important component of a sustainable community is a robust solid waste management system that places an emphasis on reducing the volume of waste generated, recycling to the greatest extent possible, and minimizing the amount of waste disposed. Since the development of the materials recovery facility for mixed containers in the early 1990s, the County’s recycling goal has steadily increased. In 2012, Montgomery County established a goal of recycling or diverting 70% of the material in the solid waste stream by the end of 2020. The County utilizes a methodology approved by the Maryland Department of the Environment (MDE) in accordance with the Maryland Recycling Act for determining the waste diversion rate. The waste diversion rate is the recycling rate plus a source reduction credit, which is earned based upon waste reduction efforts.

Montgomery County typically earns the maximum source reduction credit of 5%. Figure 4-19 shows the County’s waste diversion rate over time. The figure for 2016 is a projection pending MDE review. The sustainability benefits of this recycling derive from its life cycle effects on greenhouse gas emissions (GHG) emissions. After recycling all that it can, Montgomery County captures additional sustainability gains by using waste-to-energy (WTE) technology in lieu of landfilling. For example, during CY2015 the use of the County’s WTE facility instead of landfilling yielded a lifecycle GHG sink (reduction) of approximately 200,000 metric tons of CO2e.

The Montgomery County Public Schools (MCPS), Washington Suburban Sanitary Commission (WSSC), and Montgomery College (MC) have taken a number of steps to address the sustainability of their operations. Each of entities tracks a variety of data documenting their efforts. Figure 4-20 shows graphs MCPS includes in their annual Environmental Sustainability Management Plan related to GHG emissions and energy use. These charts are included in MCPS’s Environmental Sustainability Management Plan, which can be found at the “School
Energy and Recycling Team” link on the MCPS Department of Facilities homepage at www.montgomeryschoolsmd.org/departments/facilities/.

Similarly, WSSC and MC track energy use and GHG emissions. Figure 4-21 illustrates how the incorporation of renewable energy has affected the carbon footprint of these entities.
Figure 4-18

The Green Business Certification Program recognizes businesses certified by B Lab, DEP (under two different programs for offices and landscapers), Green America, the Green Restaurant Association, and Green Seal. Beginning in FY17, businesses certified by Veriflora, as well as entities that meet the ISO 14001 standard, were also recognized by the Program. The program had 76 recognized businesses as of the end of FY16.
Montgomery County’s goal is to divert 70% of the material in the solid waste stream by the end of 2020. In accordance with the Maryland Recycling Act, the waste diversion rate is the recycling rate plus a source reduction credit, which is earned based upon waste reduction efforts. The 62% figure for 2016 is a projection pending review by the Maryland Department of the Environment.
Montgomery County Public Schools (MCPS) extensively tracks GHG emissions and energy use. These charts are included in MCPS’s Environmental Sustainability Management Plan, which can be found at the “School Energy and Recycling Team” link on the MCPS Department of Facilities homepage at [http://www.montgomeryschoolsmd.org/departments/facilities/](http://www.montgomeryschoolsmd.org/departments/facilities/).
As part of their sustainability strategy, WSSC and Montgomery College both utilize renewable energy to meet their energy use and GHG emission reduction goals.
The Office of Sustainability is dedicated to sharing the stories of residents, businesses, nonprofit organizations, fellow government agencies and community groups that are contributing to the long-term greening of our County. It is through the combined efforts of all segments of our County that our climate emissions, water quality and waste reduction goals will be met. This chapter puts a spotlight on just a handful of those stories.

To view more sustainability stories, visit mygreenmontgomery.org. We are always looking for more stories, and to highlight new groups. Share your story with us on mygreenmontgomery.org/contact-us.
Monarch butterflies gain an ally as Bell Nursery brings milkweed to County residents

Over the past few decades, monarch populations have declined significantly. A prime reason for this is the status of a plant called milkweed, which is the only place where monarchs will lay their eggs, and it’s the only thing monarch caterpillars eat. But agriculture and development mean milkweed is disappearing at a massive rate, and the monarch is disappearing along with it—up to 90 percent of their population, some studies show.

The good news is that we can all help monarchs by planting milkweed in our yards, green spaces and community gardens. And thanks to a collaboration between area businesses and civic leaders, getting milkweed will be easier than ever.

Bell Nursery, a flower and plant company whose main greenhouses are based in Burtonsville, is the mid-Atlantic region’s largest wholesale nursery grower, producing tens of millions of plants each year for The Home Depot. Now, Bell is adding milkweed to its roster, making them available for purchase to Home Depot customers across the region.

It all started when Montgomery County resident Barbara Ashe realized what the monarch was up against. As executive vice president of the Montgomery County Chamber of Commerce, Ashe tapped into her local business network to see what could be done.
“Like many residential gardeners, I purchase plants, not seeds, when planting my backyard garden. However, the milkweed was not stocked at my local Home Depot where I often shop for my spring plantings,” Ashe said. “So, I contacted Bell Nursery which provides plants to Home Depot stores and asked if they would consider growing them and making it available to customers to buy as a plant.”

More readily available milkweed plants can make an immediate impact for monarchs.

“The good thing about milkweed is that the monarch butterfly is very effective at finding it, so even small patches matter,” Ashe said. “If it’s in a backyard or a schoolyard, individual people can make a difference.”

Following Through on a Green Mission

Bell Nursery is a company with a track record of forward-thinking environmental practices. Among these are keeping operations free of the neonicotinoids class of pesticides. “We’ve always worked hard to reduce the use of pesticides of our operation,” said Bell Nursery CEO Gary Mangum. “We’re one of the first in the nation to adopt integrated pest management.”

Everyone is familiar with the ubiquitous plastic pots, trays, and tags dotting the garden section of any home-improvement store. At local Home Depot locations, customers return those plastics to stores for recycling, courtesy of Bell. In 2015 alone, Bell recycled almost 750,000 pounds of material.

Recently, Bell was recognized as Visionary of the Year by the Montgomery County Chamber of Commerce at its Annual Dinner. Gary Mangum used the platform to raise awareness about the plight of the Monarch. But he did more than that – Bell donated 600 potted milkweed plants to guests and encouraged them to do their part. The gesture put a green exclamation point to the evening giving Mangum’s sustainability message some legs (or, as the case may be, wings)!
For renters sustainability can be simple too

With so many sustainability programs targeted towards homeowners, it often seems that renters get left out. Renters are just as “green” as owners and, more often than not, they are paying their own utility bills.

As with other kinds of residences, apartments afford opportunities large and small to go green. By following a few easy steps, you can make a real difference in the energy you use—and the money you spend.

Tamara’s Story

Germantown resident and renter Tamara Dimes achieved significant savings by participating in a “quick home energy check-up,” or QHEC through her utility company.

“It definitely saves energy. I pay the energy bills and I noticed they got lower,” Dimes said. “Saving money is a plus. With the economy these days, you want to hold onto as much money as you can.”

“It went really quickly, really convenient,” Dimes said of the QHEC she recently underwent. “It took maybe 45 minutes, tops. I like the new showerheads. You can adjust them to different settings.”
QHECs

For renters like Dimes who receive a utility bill every month, QHECs are an easy way to make a significant difference in your energy use. They are available to customers of Pepco, Potomac Edison and BGE at no additional cost. (It is covered by the EmPower Maryland program, which applies a surcharge to your existing energy bill.)

Although specific upgrades may vary, some of the common solutions a QHEC can provide include:

- **Switching out your lower-efficiency bulbs to higher-efficiency bulbs**, which can consume 80% less energy compared to incandescent light bulbs.
- **Updating less-efficient showerheads** to more water-efficient versions. These upgrades will save not only water but electricity, as demands on water heaters will also go down, thereby saving energy.
- **Installing high-efficiency faucet aerators** because these aerators reduce the amount of water flowing through the tap, thus using less energy.
- **Wrapping water heater pipes** in foam insulation to ensure that heat or condensation is not escaping from the pipes.
- **Providing you with an advanced power strip**, which prevent electronics from using power when they are off or not in use. Advanced power strips are designed primarily for home entertainment and office areas where many consumer electronics are plugged into one strip.

In Dimes’ apartment, an energy contractor with Potomac Edison completed all the energy saving measures listed above.

Even more appealing are the cost savings. Dimes said she used to pay $90-$100 for electricity each month, and now pays about $60.
Expanding sustainability engagement at Goodwill through Spark Montgomery

This past summer, Goodwill® Industries International (GII), together with other Montgomery County Certified Green Businesses, began using an online employee engagement platform to encourage staff to take a more active role in greening their offices and daily lives.

This fun social media initiative — dubbed Spark: Individual Actions, Collective Impact — is hosted by WeSpire. The WeSpire platform is also used by large organizations around the country such as Aveda, BASF, eBay, Sony, Unilever, and others as a way to embed sustainable behavior into their corporate culture.

What is Spark Montgomery?

Participating businesses are organized into teams “competing” with one another to be the greenest. Points are racked up when individual employees take sustainable actions, share environmental resources, rate green products, recruit other participants, etc. There is a leader board for top performing teams as well as individuals.

Spark is a first for WeSpire. Typically, the tool is used for individual businesses. But the Montgomery County Department of Environmental Protection (DEP) and the Montgomery County Chamber of Commerce proposed an umbrella arrangement that allowed all interested
Certified Green Businesses to participate. WeSpire liked this out-of-the-box thinking and agreed to a one-year pilot.

“We were seeking ways to encourage sustainable behavior on the part of individual employees so that Certified Green Businesses could deepen their corporate sustainability efforts,” said and Doug Weisburger, Manager of the Green Business Certification Program.

The platform also provides useful metrics so that teams can access aggregated data related to environmental benefits achieved, cost savings realized, number of employees participating, and more. This helps management understand and celebrate the collective impact of employees.

**Goodwill and Spark**

GII team members have embraced the program and taken action. With 63 staff members currently participating, GII is at the top of the leaderboard. Other companies with teams include MedImmune, AECOM, Lockheed Martin, CohnReznik, Redcoats, Amicus Green Building Center, Bethesda Green and the Montgomery County Chamber of Commerce.

GII is participating for a variety of reasons, but behavior change and metrics are the biggest focus. The platform is intuitive and easy to use, it spurs sustainability education and behavior change, and it goes hand in hand with GII’s internal “going green” program as well as its member-focused sustainability program.

In just the first four months of the campaign, the GII team took 1,250 actions and earned 13,543 points. Together, the team saved the equivalent of:

- Enough energy to power New York City for 3 seconds (6,057 kWh).
- Enough water to fill 29 bathtubs (equal to 823 gallons of water).
- Enough fuel to move a 10,000 ton freight train 5 miles.
- 517 pounds of waste diverted from landfills.
- 4,620 pounds of carbon dioxide.
- 17 reams of copy paper

“As a leading social enterprise committed to sustainability, we are thrilled for the opportunity to collaborate with local green businesses that share our values and vision for a green economy,” said Jim Gibbons, president and CEO of Goodwill Industries International. “Our progress thus far demonstrates our commitment to preserve our environment and natural resources. We look forward to additional opportunities to partner with fellow green-business certified organizations.”
Ride the wind: Takoma Park get wind-powered EV charging stations

The Electric vehicles (EV) are on the rise. According to Plug In America, an industry coalition, higher availability and lower price points have driven more than 400,000 American motorists to switch to EVs.

Proponents have long touted EVs for their ability to reduce the use of fossil fuels. But what happens to your green impact if the electricity to power the charging station itself comes from fossil fuels? Is it worth it to switch to EVs?

The government of Takoma Park has answered that question along with providing even more incentive switch to EV.

Not only did the city just install 14 EV charging stations in 2016 (each one free to all users), but all the electricity those stations deliver is wind-generated. That means any EV driver who powers up in Takoma Park is fueling his or her vehicle solely with green energy.

“Takoma Park residents are excited for the new opportunity to charge their electric cars at one of the 14 new stations on city property,” said Takoma Park Mayor Kate Stewart. “Takoma Park purchases 100 percent wind power, so residents will be powering their cars with clean, renewable energy. Making it easier for people to plug in will help more residents make the switch to electric cars, and ultimately help the city meet its substantial goals to reduce greenhouse gas emissions.”
Funding the project won’t even require a great deal of taxpayer dollars. The Electric Vehicle Institute, an EV supply equipment company based in Baltimore, is donated the stations and the labor as part of an effort to foster EV use in the region.

“Our agreement with Electric Vehicle Institute made the stations free, including installation, and three years of maintenance,” said Gina Mathias, Takoma Park’s sustainability manager. “We want to be sure to thank them for being such great partners, and making this project possible.”

One of the institute’s key goals is to install as many stations as possible to help combat “range anxiety,” or the fear EV drivers have of running out of juice away from home base.

“Easy adoption is our mission statement,” said Matthew Wade, the institute’s president and CEO. “[Takoma Park] is a community of forward-looking people that want to do things for the environment. Working with them was obvious.”

Mathias estimated that each charging station—all of which are designed to be compatible with more or less every EV model—can charge 70 percent of an EV battery in about two hours.
Silver Spring Civic Building brings community engagement to sustainability

A civic building is more than just a place to hold meetings. In Silver Spring, it means a chance to demonstrate values and sustainable living.

Green Silver Spring

The Silver Spring Civic Building (SSCB) has recently undergone a host of changes and upgrades to make it greener and more attractive to users, visitors, and residents alike. As such, it has become a local attraction as well as a reflection of local values.

“It very much has a community feel, but also the feel of an event venue,” said building operations manager Eric Rasch. “Folks come in from all ages and all walks of life. People come to Silver Spring and they come in here knowing it’s a good place, and it’s sustainable. It gives them a good feeling.”

In the past six months, SSCB made sustainability changes large and small. It reflects Silver Spring’s collective desire to be green, as well as the County’s larger environmental plan for public buildings.
Diverting Waste Stream

Among the changes already in place, Rasch talks most excitedly about recycling. It’s not the most glamorous thing, but it’s no small feat in a building as large as the 13,600-square-foot SSCB, especially not when you’re doing it to this extent.

According to Rasch, SSCB recycles 50 percent of its waste stream—significantly higher than the average for an equivalent facility.

“One of the things we really emphasize is recycling,” Rasch noted. “There is lots of paper, waste, glass, all types of stuff that need to be recycled.”

The building’s recycling efforts range from the ostensibly mundane to the cutting-edge. Some examples include:

- Filling trash bags to capacity before they are pulled to empty;
- rigorous staff training about recycling; and
- solar-powered waste receptacles throughout surrounding Veterans Plaza that provide as much as four times more waste space.
Less visible is the magnetic-bearing chiller that helps cool the building down. Compared with more traditional technology, this kind of chiller reduces friction (and, thus, the amount of heat the chiller must reduce) and lasts longer.

**Leading on Solar**

Solar energy is about to power a lot more than waste receptacles at SSCB.

On March 22, officials flipped the switch on 128 solar modules, which were placed on the building’s roof. Together, they will produce more than 49,000 kWh of renewable electricity each year—the equivalent, from a carbon-emissions standpoint, of taking seven cars off the road or planting 17,000 new trees.

According to Eric Coffman, chief of the Office of Energy and Sustainability in the Montgomery County Department of General Services, SSCB is one of the first county buildings to receive solar panels, but far from the last. This is the first phase of a larger goal to install six megawatts (6 MW) worth of solar energy across 12-14 county facilities. Over the next 20 years, Coffman said the plan is intended to save the county $11 million in energy expenditures and create 100 jobs.

The SSCB, and Silver Spring in general, made sense as a starting point for the project.

“This is one of the earlier buildings where we really applied a super-deep, green overhaul,” Coffman said. “It’s part of the culture of Silver Spring. It’s a community that’s very vocal in a good way about being sustainable and walkable.”
Outdoor classroom beautifies Seven Locks Elementary School

When the brand new Seven Locks Elementary School building opened in 2012, people were excited. The modern facility in Bethesda was a vast improvement over the previous school which had become outdated over time.

There was just one problem.

“The teachers were lamenting that they had no place to take the kids outside,” said Dorothy Chung, a parent volunteer with the school. “There was not much of a natural landscape on the new school grounds.”

The school’s network of volunteers took action, led by the Seven Locks Elementary School Educational Foundation, which helps raise money for capital improvements at the school. How could they create a natural space for students and teachers alike? Furthermore, how could they tie the school to the historic C&O Canal, which sits along the Potomac River and serves as the school’s namesake?

The answer was a conservation landscape. Now, thanks to support from the Montgomery County Department of Environmental Protection RainScapes program, the landscape is a
Teachers and volunteers say it is a beautiful environment that can function as an outdoor classroom for students from kindergarten to fifth grade.

“We wanted the students to think about the connection between caring for plants and caring for the watershed around us,” said Sandy Vogelsang, another school volunteer and director of the school foundation. “You can make it something that matters to kids.”

Debbie Friedman, the master gardener who designed and oversaw the installation of the landscape, drew inspiration from the C&O Canal in the plants and design elements she selected. For example, Joe Pye weed, a native plant that is common around the Potomac River, can grow several feet high for a dramatic effect. Northern sea oats, a native grass species, was planted in curving segments of the garden to achieve an aquatic effect.

“The lock theme was the linchpin of the design,” Friedman said. “The design was simulating a river bed with plants of the Potomac River. They provide movement when the wind blows, and it mimics water flowing.”

The landscape design also has the classroom in mind. Stepping stones go through the plants “to help students interact with the garden,” Chung said.

Adrienne Torrey, an art teacher at Seven Locks Elementary, has taken first and second graders out to the landscape for special classes. Students drew observational drawings of flowers they found in the garden.

A year or more later, Torrey said her students still remember the experience.
“There are so many skills that can be developed outside,” Torrey said. “There is flexibility, with using multiple resources. They are generating ideas and adding details. The students spoke about it really positively. It’s good for them to see real objects instead of pictures of the object.”

Chung, who currently serves as the school foundation’s president, estimated the total price tag was between $15,000 and $18,000. However, thanks to a Rainscapes rebate and community fund-raising efforts, the ultimate out-of-pocket cost was only a few thousand dollars.

The planting day was an opportunity for the school community to work together.

“This absolutely would not have been possible without RainScapes,” Chung said.

*Butterfly Milkweed in the garden*
Garden-style condo communities have a lot of room for greening

Vicki Vergagni didn’t know much about trees when it all started. Now she can pick out individual species from her car window.

“I’m in love with trees now,” she said with a laugh. “I notice them everywhere I go. I can spot them all when I’m driving and point them out by their Latin names.”

Glen Waye Garden Condominiums, where Vergagni is president of the Board of Directors, were built around 1965. As recently as a few years ago, the 15-acre property, which includes 214 housing units in 28 buildings in Silver Spring’s Glenmont area, wasn’t exactly a bastion of environmental sustainability.

More than 200 trees, several conservation landscapes and a raft of water- and energy-saving projects later, Glen Waye is more desirable to residents and has reduced its utility bills by hundreds of thousands of dollars per year. In the process, Glen Waye has become a green leader in the County and a model for how garden-style properties can go green by taking advantage of their own unique characteristics.

“We’ve got an eye to the future on a lot of this,” Vergagni said. “We’re taking our savings and plowing them back into upgrading the buildings...People love it.”
A Shady Proposition

Generally speaking, garden-style apartments or condominiums consist of a group of low-rise buildings arranged around a series of landscaped courtyards. Usually the apartments take up much larger footprints by total acreage than their high-rise counterparts.

Over the past year and a half, Glen Waye leaders have taken advantage of their large footprint, planting 218 trees. Residents are literally seeing a big difference.

“People are outside and enjoying it,” Vergagni said. “It’s done wonderful things for the property.”

As the shade trees grow, they will cool the air around the buildings and shade the buildings, thus, by extension, lower summer air conditioning (A/C) bills. According to research done by the Alliance for Community Trees, properly placed shade trees can reduce cooling costs by 30 percent.

Two local programs, Vergagni said, helped make the widespread plantings possible.

The first was Shades of Green, developed by the Maryland National Capital Park and Planning Commission in a partnership with Casey Trees, a DC-based nonprofit dedicated to restoring the
tree canopy throughout the area. Through the program, eligible homeowners and homeowners’ associations receive free shade trees and technical assistance.

Glen Waye residents received 24 shade trees through that program. But they weren’t done. A grant from the Chesapeake Bay Trust, funded by the Montgomery County Water Quality Protection Fund, provided partial funding for 60 more trees and ground cover. An additional 82 ornamental trees, along with native plants for conservation landscapes and 13 animal sculptures made from recycled metal, rounded out the project. The grant was coordinated for Glen Waye by Bethesda Green.

Massive Energy Savings

Of Glen Waye’s $1.1 million annual operating budget, more than 40 percent used to go to utility bills. Now energy spending is down to 33 percent of that budget. That’s an approximate reduction from $440,000 to $355,000, equating to approximately $85,000 in annual savings as a direct result of the sustainability upgrades.

Among Glen Waye’s energy-saving upgrades:

- New energy-efficient windows in all buildings;
- High-insulation concrete siding;
- Water-saving aerators on faucets;
- Shower timers that alert users of the most efficient durations;
- Magnetic vent sealers that help minimize unnecessary HVAC use;
- Pre-programmed and targeted thermostat settings for all resident fridges and freezers;
- “Cool roofs” that prevent unnecessary A/C use by reflecting solar rays;
- LED light fixtures across the property (the cost of this was $112,000 but the community will receive $46,000 in rebates from Pepco for the project); and
- Programmable thermostats for many residents.

“These things, even the little things,” Vergagni said, “make a huge difference.”
County resident makes green upgrades part of retirement preparation

When Tom Ripp began planning his retirement, he didn’t start with stocks or bonds or downsizing. He started with sustainability.

For this 55-year-old Gaithersburg resident, who currently works part-time as a chemical engineer with the EPA, major energy upgrades made his home more financially and environmentally sustainable. When Ripp sold some stock from a brokerage account to move his house toward carbon neutrality, he viewed it as a retirement investment on par with many others.

“I look at it as capitalism meeting environmentalism,” Ripp said. “For investments, I try to look at things that are good over the long term. What I’m doing is I’m reducing my risk in the stock market, and I’m reducing an ongoing and fairly known expense.”

Although he made several changes around the house, including installing new insulation for better efficiency, the two main upgrades were installing a geothermal system and solar panels on his garage roof. “It’s like paying up front for heating and cooling and electricity for the next 20 or 30 years,” Ripp said.
Digging Deep for Savings

Geothermal has long been one of the most effective—and, at least initially, expensive—sources of renewable energy. For Ripp’s open-loop system, water from the geothermal well enters the house and splits for domestic water heating and for the interior heat exchange unit, which is similar in size to a conventional furnace.

Because that water remains at a constant temperature year-round—typically between 50-60 degrees Fahrenheit—it regulates temperatures inside the house more efficiently than a traditional heat pump and greatly reduces or eliminates the need for traditional heating and cooling systems.

That’s the situation for this homeowner, who said his geothermal system will pay for itself in less than seven years. Although the initial cost for the system was around $27,000, various financial incentives including a 30 percent federal tax credit—that unfortunately expired in 2016—and a rebate from his utility company, Potomac Edison, brought the final project total down to roughly $13,000.

The cost of Ripp’s system was somewhat lower than average because of existing infrastructure on his property. Because Ripp gets his water from a well, contractors were able to construct a so-called standing column geothermal system, which uses the well water for heating and cooling as well as the existing hole. They only needed to dig down a little deeper.

Ripp, who used heating oil in his home before installing the three-ton geothermal unit, says the upgrade saves about 500 gallons of heating oil a year.

“I think it’s the most energy-efficient way to heat and cool a house,” Ripp said. “And I’m not combusting anything.”

Here Comes the Sun

After installing solar panels, calculating conservatively, Ripp estimated the panels will pay for themselves in about 20 years, but could be as little as 10 years or even less, depending on various market forces. Over the past year, Ripp said, he purchased a paltry 24 kilowatt hours of electricity from the utility company—that’s less than one day’s worth of electricity.

“I put my money where my mouth is. The way I figure it, let’s do what we can,” Ripp said. “Going geothermal and solar is a way to profit from the resources on your own property, it is socially responsible, and it helps the state of Maryland meet its environmental goals. It’s a win-win-win.”
MCPS uses art to teach about sustainability

The Montgomery County Public School system is constantly innovating to engage students in new and imaginative ways. This past year, MCPS programs used art to teach environmental lessons that also tap into the students’ creative sides.

Arcola Elementary School Recycled Material Art

The Arcola Elementary School Recycled Art Show and Green Sculpture Garden dedication was held on May 12, 2016. At this unique show, students, families and community members were able to view student artwork created from recycled materials collected by the school community.

Their artwork included recyclables made from soda cans, microwave dinner trays, water bottles, plastic caps and magazine scraps. The school also dedicated a green sculpture garden that was created by its fifth grade class.

Pictured here and at the top of the page: Arcola Elementary recycled art
Watts Up? Poster Contest

Schools look forward to this popular annual contest that encourages students from Grades K through 12 and staff to create posters to demonstrate their efforts in energy and water conservation and recycling. This contest creates healthy competition among students and staff to produce artwork to increase the conservation awareness among their peers systemwide.

Many schools hold poster-judging contests and submit their winning entries to the School Energy and Recycling Team (SERT) contest. The posters communicate the importance of environmental conservation through the artistic talents of MCPS students and staff. The winning posters are printed and distributed systemwide to increase awareness about environmental conservation.

Each year, more than 70 MCPS central office staff participate as judges to select the winning posters. SERT received 390 entries during FY 2014–16.

This campaign challenges all secondary schools to create a model resource conservation plan to include energy conservation and responsible recycling projects or initiatives toward a sustainable future. The SERT program encourages all MCPS middle and high schools to participate in the Lead by Example contest to further reinforce a culture of conservation and sustainability at their schools and in their communities.

Many of the entries include behavioral strategies, energy efficiency projects, and awareness campaigns. Often, initiatives such as energy audits with recommended conservation practices, task lamps for staff, computer shutdowns, contests, recycling weight increase plans, video, and social media awareness strategies are practiced at the schools as a result of this campaign. All of these actions promote behaviors among students, staff, and the community to be responsible environmental stewards. The winning entries with proven projects and initiatives are highlighted in SERT Best Management Practices, an online resource for all schools to use as helpful conservation strategies and expectations for efficient building use and operations.
The Bicycle Stress Map: Using data to make the County bike friendly

The Montgomery County Planning Department is working to encourage more people to bicycle by looking deeply at the challenges commonly facing cyclists.

A new digital tool, the Bicycle Stress Map, is helping planners in this effort by showing the stress levels encountered when bicycling in Montgomery County. The map identifies impediments to bicycling in the County, such as heavily trafficked routes and intersections, high-speed roads and other hazardous conditions. The value of this planning resource was recognized in 2016 with an Outstanding Tool Award from the National Capital Area Chapter of the American Planning Association.

Creating the Bicycle Stress Map required Planning Department staff to evaluate nearly 3,500 miles of roads and trails in the County to assign a level of stress, from very low to very high, experienced by cyclists on each road segment and every crossing.

This interactive tool, which is accessible from the Planning Department’s website, displays the data in a way that can inform the public about bicycling in the County and help decision makers prioritize bicycling improvements.
• Users can toggle between stress levels to reveal the bicycling network available to people, depending on the different levels of traffic stress they tolerate.
• Videos capture the look and feel of different stress levels.
• Connectivity analyses that show how well each rail station, public school, library, recreation center and regional park is connected to the surrounding neighborhood.
• Ability to customize a bike shed analysis to reveal the areas that can be reached without exceeding a cyclist’s comfort level.

The map is being used to identify changes that are needed to create a low-stress bicycling environment for those people who say they would be interested in bicycling more if they weren’t so concerned for their safety.

**Key Findings of the Stress Map**

The Bicycle Stress Map has resulted in key findings about bicycling in the County, including:

• About 70 percent of road miles are suitable for most cycling adults, but only a fraction of trips can be completed on a low-stress network, due to the inability to reach destinations with minimal detours.
• Only 18 percent of homes within a two-mile distance of a Red Line Metrorail station can reach the nearest station on a low-stress network.
• Connectivity is poor around schools. Only 20 percent of homes are connected to elementary schools, 10 percent to middle schools and 5 percent to high schools on a child-appropriate bicycling network.

Montgomery County’s Bicycle Master Plan is scheduled to be approved by the County Council in 2018. The vision of the plan is to make Montgomery County a world-class bicycling community where everyone will be able to travel by bicycle on a comfortable, safe and connected network, and where bicycling will become a viable transportation option and elevate the quality of life.

Plan recommendations will address an array of bikeway types, including separated, buffered bike lanes and bicycle boulevards, as well as how to provide secure bicycle storage facilities at transit stations. Tools such as the Bicycle Stress Map are assisting in the development of the master plan and helping to make Montgomery County a national leader in suburban bicycle planning.
Montgomery Parks - Shining Bright with LED Technology

Montgomery Parks has been working to keep county parks safe and more energy-efficient through the installation of light emitting diode (LED) technology in parking lot areas. The program to convert parking lot lights to energy-efficient LED technology began nearly 10 years ago with a pilot-project at Olney Manor Recreational Park that replaced 80 traditional metal halide and high-pressure sodium lights with LED fixtures. Since implementation of that pilot project, Montgomery Parks staff have received only one request for maintenance service of the LED lighting in this parking lot since the original installation.

While LED technology does cost more up-front over traditional lighting, the cost savings in maintenance and energy consumption over their lifetime cannot be understated. LED lights produce high-quality illumination and, on average, consume anywhere from 30-60% less energy over traditional lighting for similar applications.

The success of this initial pilot project has been encouraging for staff at Montgomery Parks, and as funding permits, additional lighting upgrade projects have been completed across the park-system over the last 10 years. In 2016 alone, 21 park locations across the county were retrofit with LED parking lot lighting, accounting for over 130 fixtures.

Replacement of lighting is just one of the many ways Montgomery Parks shows its commitment to the environment and sustainability through improved energy efficiency across parkland county-wide.