

Fairfax County Operational Energy Strategy



July 10, 2018



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FAIRFAX COUNTY OPERATIONAL ENERGY STRATEGY

Table of Contents

Preface	i
Introduction	ii
Background.....	1
I. The Board is Committed to Environmental Stewardship	1
II. The Operational Energy Strategy is the Product of an Extensive Cross-Organizational Effort.....	3
III. Reducing Energy Use Demonstrates Both Environmental and Fiscal Stewardship.....	4
Strategy Overview.....	5
Focus Area: Energy Use and Efficiency	6
Focus Area: Water Use and Efficiency.....	7
Focus Area: Green Buildings	8
Focus Area: Innovative Energy Solutions.....	10
Focus Area: Electric Vehicles.....	11
Focus Area: Goods and Services.....	12
Focus Area: Waste Management.....	13
Focus Area: Awareness and Engagement	14
Focus Area: Utility Cost Management.....	15
Focus Area: Reporting and Collaboration.....	16
Appendix 1: Abbreviations and Acronyms	
Appendix 2: Fairfax County 2016 Energy Data	
Appendix 3: Estimated Energy Savings and Utility Cost Avoidance	
Appendix 4: Estimated Emissions Data	



Preface

Good governance requires elected bodies to provide effective services, efficient operations, transparency, accountability, equity, and competitiveness. The Operational Energy Strategy (Energy Strategy) provides guidance to Fairfax County agencies on the delivery of efficient, sustainable, and affordable operations. The Energy Strategy is a call to action for County agencies to become more energy conscious and find ways to reduce their energy consumption.

The intended purpose of this Energy Strategy is to ensure energy and resource efficiency are explicitly considered, examined, and executed throughout all County government operations and decision-making. The efficient and conscientious use of energy by local jurisdictions is essential to modeling good governance and a prudent use of taxpayer dollars. As we move into an ever more energy conscious 21st century, Fairfax County must become more energy efficient in order to sustain its appeal as a nationally recognized business location. As such, Fairfax County government has a responsibility to be a leader in workplace energy efficiency.

The Energy Strategy promotes cost-effective, energy-efficient, innovative technologies, and an energy conscious culture that encourages strategic decisions with regard to energy consumption. The reduction in energy use will help mitigate escalating energy costs and promote a “greener” future for the County.

Energy efficiency, conservation, renewable innovation, and education are key elements of the Energy Strategy because of their potential to reduce overall energy demand, costs, and consumption. The Energy Strategy also plays an important role in addressing climate change by lowering overall greenhouse gas emissions. Reducing energy consumption is often the most economical strategy to advance climate protection efforts and provides an environmentally safe alternative to increased energy production and consumption.

The Energy Strategy advances goals in the Economic Success Strategic Plan by investing in sustainable and cost saving infrastructure, modeling good governance, supporting effective and efficient services, and increasing internal innovation and government agility. The Energy Strategy is not a static document and may be modified in the future to reflect emerging “best practice” energy efficiency, conservation, and energy management strategies and initiatives.

Employing this strategy among county employees, managers, agencies, and government leadership will be required to effect lasting solutions to the energy challenges we face. While we have made great strides, we can and must do more. The board and I trust that all county staff will take up the challenge to support the county’s Operational Energy Strategy.

Fairfax County Board of Supervisors
Sharon Bulova, Chairman



Introduction

In adopting its updated [Environmental Vision](#) (June 20, 2017), the Board of Supervisors (Board) approved objectives in the areas of energy efficiency, conservation and renewable energy intended to reduce both the county's operational use of energy from fossil fuel sources and the greenhouse gas (GHG) emissions associated with that energy use. These objectives include: (1) ensuring that cost-effective energy efficiency is an integral part of county operations, capital improvement and capital renovation projects; (2) seeking opportunities to incorporate cost-effective renewable energy generation at county facilities; (3) considering life-cycle energy costs when making procurement decisions; and (4) educating employees on the importance of energy efficiency and conservation.¹

This Fairfax County Operational Energy Strategy is intended to further the board's objectives by providing goals, targets, and actions in each of the following 10 focus areas:

Energy Use and Efficiency	Goods and Services
Water Use and Efficiency	Innovative Energy Solutions
Waste Management	Utility Cost Management
Green Building and Sustainability	Electric Vehicles
Awareness and Engagement	Reporting and Collaboration

No focus area is the responsibility of one department or agency alone. Fairfax County Government leadership, management, and employees will need to work together to successfully implement this ambitious energy strategy. Detailed action plans and increased inter-agency coordination and cooperation will be crucial. In some cases, leadership and management may need to expressly empower staff to act in furtherance of the goals, targets, and actions in this Strategy. Periodic reviews and updates will help ensure it remains vital despite expected advances in technology and legislative and regulatory change.

Achieving the Strategy's goals and targets requires financial commitments from the board, departments, and agencies. Initial capital outlays, adequate staffing and resources, and dedicated funding are essential both to undertake the energy and cost-saving actions in this Strategy and to realize their benefits. Investing in efficiency improvements and other actions to reduce energy and water consumption will generate returns for decades, well beyond initial payback periods.

¹ The cost-effectiveness of energy efficiency and renewable energy should not be confused with "value engineering," which is embedded in county policy regarding capital improvement and/or renewal projects that exceed a specified cost threshold. Cost-effectiveness should consider direct electricity cost avoidance due to efficiency as well as other tangible or quantifiable benefits, including reduced maintenance costs associated with equipment specifications, regulated emissions avoidance and the value of stable energy prices.

Background

I. The Board is Committed to Environmental Stewardship

Fairfax County, which is home to over 1.1 million residents, is governed by an elected 10-member Board of Supervisors (board). Through its [Statement of Priorities](#), the board has pledged to engage residents and business and to protect investment in eight critical areas, including “a clean, sustainable environment.”

Fairfax County will continue to protect our drinking water, air quality, stream valleys and tree canopy through responsible environmental regulations and practices. We will continue to take a lead in initiatives to address energy efficiency and sustainability and to preserve and protect open space for our residents to enjoy.

Fairfax County has long recognized the need for proactive policies and initiatives to address its environmental goals and challenges. Indeed, environmental considerations, including those relating to the efficient and prudent use of energy resources, are embedded in the county’s policy documents and initiatives.

In 2004, the board endorsed and adopted its “Environmental Excellence for Fairfax County: A 20-year Vision,” also known as the Environmental Agenda. The Environmental Agenda, as adopted in 2004 and revised in 2007, was organized into six core services: (1) Growth and Land Use; (2) Air Quality and Transportation; (3) Water Quality; (4) Solid Waste; (5) Parks, Trails, Open Space; and (6) Environmental Stewardship. The Environmental Agenda describes environmental stewardship as both a key responsibility and a critical legacy of any elected public body.

Subsequently, in collaboration with local, regional, and national partners, Fairfax County led a national effort, called Cool Counties, to reduce global warming emissions. The Board of Supervisors signed the [Cool Counties Climate Stabilization Declaration](#) on July 16, 2007. In signing this pledge, the board committed to certain actions, including working closely with local, state, and federal governments to create a regional greenhouse gas (GHG) emissions inventory and to limit regional emissions by 2050. At the local level, the Board of Supervisors committed in paragraph (i) of the Declaration to implement “policies, programs and operations to achieve [a] significant, measurable and sustainable reduction” of its own operational GHG emissions to help contribute to the regional reduction targets. As a result of these efforts, Fairfax County cut its per capita GHG emissions between 2005 and 2012 by 10 percent, as did the metropolitan Washington, D.C. region.

In 2008, the board adopted its [Sustainable Development Policy for Capital Projects](#), sometimes referred to as the county’s “green building” policy. This policy applies to the design and construction of new county buildings and renovations or additions to existing ones. Under this policy, county buildings of more than 10,000 square feet in size must have a goal of meeting or exceeding silver certification in the Leadership in Energy and Environmental Design, or LEED®, rating system; smaller facilities are recommended for LEED certification. (Green building policies for private sector development are found in the county’s Comprehensive Plan and are implemented through the zoning process.)

In 2009, the board adopted an [Energy Policy](#) to promote pragmatic conservation and management of energy resources. The Energy Policy supports nine measures, including:

- Energy efficiency and conservation in buildings, facilities, operations, and vehicles.
- The use of alternative and sustainable energy options.
- Waste reduction and recycling.
- The use of more fuel efficient and alternate fuel vehicles in the county's fleet.
- Implementation of energy efficiency and conservation projects.
- Generation of energy on-site.
- Energy efficiency and conservation efforts by county employees, employers and residents.

These measures, which are incorporated in this Operational Energy Strategy, were intended to advance essential elements of the Environmental Agenda, including the efficient and prudent use of energy resources, the promotion of energy conservation, and support for alternative energy sources.

On October 6, 2015, the Board of Supervisors directed county staff to review the 2004 Environmental Agenda with community and board involvement to determine whether the document needed to be updated. Following extensive public and internal comment, staff drafted an updated document that the board adopted on June 20, 2017. Major changes included the addition of a new section addressing Climate and Energy, refinements to the scope of the initial six core services, and the addition of environmental vision statements and supporting objectives. The updated document, now referred to as the [Environmental Vision](#), is still premised on the same two principles originally adopted by the board in 2004. First, that *"conservation of our limited natural resources must be interwoven into all government decisions."* And, second, that *"the Board must be committed to providing the necessary funds and resources to protect and improve our environment for better quality of life now and for future generations."*

This Operational Energy Strategy promotes the stewardship goals set forth in the board's environmental policies and initiatives, particularly the commitment to local action as stated in Paragraph (i) of the Cool Counties Climate Stabilization Declaration, the goals of the county's Energy Policy, and the objectives of the 2017 Environmental Vision. Indeed, the Strategy incorporates many of the supporting objectives of the 2017 Environmental Vision's new Climate and Energy section, thereby ensuring close alignment. These objectives include:

- Ensuring that cost-effective energy efficiency is an integral part of county operations, capital improvement, and capital renovation projects;
- Seeking opportunities to incorporate cost-effective renewable energy generation at county facilities;
- Considering life-cycle energy costs when making procurement decisions;
- Educating employees on the importance of energy efficiency and conservation; and
- Advocating for new laws that support countywide implementation of energy efficiency and renewable energy.

II. The Operational Energy Strategy is the Product of an Extensive Cross-Organizational Effort

In 2014, the county's inter-agency Energy Efficiency and Conservation Coordinating Committee (EECCC) established a cross-organizational energy strategy team for the purpose of developing an internal operational energy strategy. Team members realized that this strategy would be essential to establishing priorities and setting the direction for the county's departments and agencies.

The energy strategy team members spent over a year brainstorming the strategy, considering different approaches, and debating goals, actions, and priorities. Work on the strategy was then delayed as key team members focused on the Environmental Vision update, subsequently adopted by the board in June 2017.

In early 2017, a core team began distilling the energy strategy team's work with the objective of drafting a high-level energy strategy for county operations that would be readable and easy to understand and follow. The core team sought to avoid creating a document that was so dense or complicated that it would simply sit on a shelf. This work received added impetus in June 2017 when the board, during the meeting at which it adopted its updated Environmental Vision, directed the county's Environmental Coordinator to develop an energy strategy for internal county operations consistent with the updated Vision's new Climate and Energy section.

Over the next several months, a draft Strategy was circulated among key county operations personnel. County departments and agencies that provided comments, suggestions and proposed revisions included the Capital Facilities, Solid Waste and Wastewater divisions of the Department of Public Works and Environmental Services, Facilities Management Department, Department of Procurement and Material Management, Department of Vehicle Services, Fairfax County Department of Transportation, Department of Information and Technology, and the Fairfax County Park Authority. In addition, the core team, including the Environmental Coordinator, met individually with representatives of these departments and agencies to ensure the viability of goals, targets and actions proposed in the draft Strategy. Following these meetings, a revised version incorporating relevant feedback was distributed to the departments and agencies for final sign-off.

In November 2017, a final version of the draft Operational Energy Strategy was presented to the county's then-Acting County Executive and Chief Financial Officer. This version of the draft Strategy was presented to the County Executive in January 2018. A revised version was subsequently presented to both the County Executive and Chief Financial Officer in May 2018.

On February 13, 2018, the draft Operational Energy Strategy was presented to the Board of Supervisors Environmental Committee, prior to release for targeted public comment and formal consideration by the Environmental Quality Advisory Council. A committee decision regarding the document was scheduled for June 2018 to provide adequate time for public input and revision, if necessary.

III. Reducing Energy Use Demonstrates Both Environmental and Fiscal Stewardship

Both the 2007 Cool Counties Climate Stabilization Declaration and the [Region Forward Vision](#) adopted in 2010 by the Metropolitan Washington Council of Governments, of which Fairfax County is a member, envision an 80 percent reduction in regional greenhouse gas (GHG) emissions by 2050. Reaching this target will require a sustained, multi-pronged effort to reduce fossil fuel use, thereby reducing the carbon dioxide (CO₂) emissions recognized to drive global warming. This effort must include actions such as emphasizing energy efficiency and conservation, increasing reliance on renewable energy and alternative technologies, and behavior change. Fortunately, actions that reduce fossil fuel use not only avoid CO₂ emissions, they tend to lower utility bills, as well, thus providing both environmental and fiscal benefits.

In 2016, electricity use accounted for 51 percent of the county's energy use but 65 percent of its CO₂ emissions and 69 percent of its energy costs. Natural gas, meanwhile, accounted for 24 percent of the county's energy use, but only 14 percent of its CO₂ emissions and 11 percent of its energy costs.

Fairfax County 2016 Energy Data

Fuel Type	Percent of Energy Usage	Percent of CO ₂ Emissions	Percent of Energy Cost
Electricity	51%	65%	69%
Natural Gas	24%	14%	11%
Gasoline	14%	12%	12%
Diesel	11%	9%	8%

More information regarding the county's energy consumption, costs and related emissions is provided in Appendix 2.

Staff involved in developing this Operational Energy Strategy agreed that the county's energy data indicates that actions that reduce electricity use are likely to reap the largest gains in terms of reducing overall energy use and CO₂ emissions and avoiding cost. As a result, many – but not all – of the goals, targets and actions in the Strategy are focused on reducing electricity use.



Strategy Overview

The Operational Energy Strategy is intended to clearly communicate county objectives regarding energy use and to provide guidance for achieving them, subject to support including adequate staffing and resources and dedicated funding. Further, the Strategy is intended to be a living document. While its goals, targets and actions reflect current conditions, periodic review and update will help ensure that these elements of the Strategy remain meaningful.

The Strategy consists of 10 **focus areas**, each with its own goal, target and sample actions. These focus areas, listed below and discussed separately in the following sections, tie the Strategy to the 2017 Environmental Vision by reflecting Climate and Energy objectives regarding energy efficiency, conservation, and renewable energy.

Energy Use and Efficiency	Goods and Services
Water Use and Efficiency	Innovative Energy Solutions
Waste Management	Utility Cost Management
Green Building and Sustainability	Electric Vehicles
Awareness and Engagement	Reporting and Collaboration

As noted in the Introduction, no focus area is the responsibility of any one department or agency alone. Fairfax County Government leadership, management, and employees will need to work collaboratively to successfully implement this Strategy.

The **goal** for each focus area is a long-term objective that, as a general rule, reflects some or all of various board policies or initiatives.

The **target** for each focus area is intended to provide specific direction. The target was derived through a multi-step process including review of existing and planned department actions and goals, consultation and discussion with key operations personnel, and research into other jurisdictions' goals and targets. Targets should be periodically reviewed and updated to ensure they remain vital despite expected advances in technology and legislative and regulatory change.

The **actions** in each focus area are intended to help achieve the target and goal of a specific focus area. Listed actions are a set of possible opportunities directed towards operations personnel that can reduce fossil fuel use and avoid CO2 emissions.

Focus Area: Energy Use and Efficiency



This focus area encourages the reduction in or avoidance of energy use by practices including energy conservation and energy efficiency. As defined by the federal Energy Information Administration, “energy conservation” is any behavior that results in the use of less energy, while “energy efficiency” is using technology that requires less energy to perform the same function.

Turning off lights when leaving a room is a common example of energy conservation, while replacing incandescent or fluorescent lighting with LED lighting is a common example of energy efficiency. The benefits of reducing or avoiding energy use in county operations include lower utility or fuel bills, reductions in emissions and pollutants attributable to the county’s energy use and, in many cases, enhanced comfort for building visitors and occupants.

Goal:

Reduce electricity and natural gas use in existing county facilities and operations.

Target:

Reduce kBtu per square foot by 20% from 2019 to 2029, equivalent to a reduction of about 2% per year over the 10-year period.

Actions:

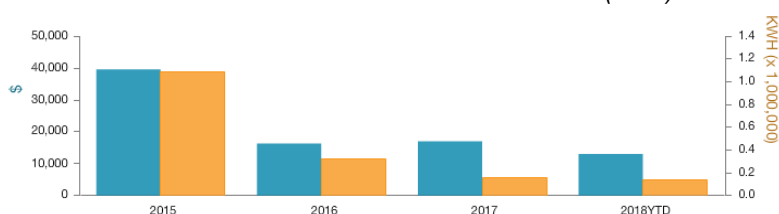
1. Monitor and analyze energy use and facility performance.
 - Use EnergyCap or similar energy software to track, report and analyze energy data.
 - Review utility bills and other available data to identify areas of opportunity.
2. Routinely audit and assess existing building stock for energy efficiency opportunities.
 - Incorporate natural landscaping to maximize shading and minimize irrigation where appropriate.
3. Engage in practices to optimize facility and equipment performance.
 - Utilize a systematic preventative maintenance system to maintain energy efficiency in existing equipment.
 - Implement a commissioning program for ongoing performance improvements.
4. Identify and implement cost-effective energy efficiency projects.
 - Exceed Virginia code requirements when replacing equipment and fixtures.
5. Install energy management systems and automation controls and ensure appropriate programming and maintenance
6. Include a facility’s energy efficiency and costs as considerations in leasing decisions.
7. Routinely evaluate new technologies that can reduce energy use.
8. Ensure appropriate training for staff.

Focus Area: Water Use and Efficiency

This focus area encourages the implementation of conservation and efficiency measures to reduce or avoid water use in county operations, thereby achieving both energy savings and environmental

benefits. Direct benefits of using water resources more efficiently include reductions in the county's water and sewer bills and the conservation of valuable treated drinking water. Indirect benefits include a reduction in the region's electricity use, as it requires an estimated 2,300 kilowatt hours of electricity to pump, treat, transmit, and distribute one million gallons of potable water.

Results of Government Center Restroom Renovation (2016)



Goal:

Reduce water use in existing county facilities and operations.

Target:

Reduce water usage 20% for all new construction or major renovations.

Actions:

1. Monitor and analyze water use and equipment performance.
 - Use EnergyCap or similar energy software to track, report and analyze water data.
 - Review utility bills and other available data to identify areas of opportunity.
2. Routinely audit and assess existing building stock for water efficiency opportunities.
 - Incorporate natural landscaping to minimize irrigation and maximize shading where appropriate.
3. Engage in commissioning, preventative maintenance, and other practices to optimize cooling tower and other equipment performance.
4. Identify and implement cost-effective water efficiency projects, including water-conserving fixtures and systems.
 - Exceed Virginia code requirements when replacing equipment and fixtures.
5. Expand use of control systems to maximize water efficiency and ensure appropriate programming and maintenance.
 - Install leak detection sensors in facilities at higher risk of water loss or damage.
 - Install web-based irrigation control systems.
6. Routinely evaluate new technologies that can reduce water consumption.
7. Ensure appropriate training for staff.

Focus Area: Green Buildings

Stringfellow Road Park-and-Ride (LEED Silver Certified)



In the United States, buildings account for almost 40 percent of national CO₂ emissions and out-consume both the industrial and transportation sectors. However, according to a 2016 report by the non-profit U.S. Green Building Council (USGBC), which developed the LEED® rating system, LEED-certified buildings have 34% lower

CO₂ emissions and consume 25% less energy and 11% less water.¹ This focus area seeks to ensure that the performance of county facilities achieves or exceeds these USGBC-reported results.

Goal:

Ensure that new construction and major renovations of county facilities are energy- and water-efficient.

Target:

Achieve LEED Silver on all new facility construction, additions and renovations with an occupied area greater than 10,000 square feet.

Actions:

1. Coordinate among agencies to ensure that a facility's lifetime energy and water use are minimized by design, including incorporation of cost-effective systems, fixtures, and equipment that use resources efficiently.
 - Incorporate highly-efficient mechanical and lighting systems.
 - Incorporate highly-efficient water systems and fixtures.
 - Incorporate building automation and controls.
 - Design the building envelope for energy efficiency.
 - Integrate water recycling or reuse where possible to reduce water use for non-potable needs.
 - Incorporate natural landscaping to minimize irrigation needs and maximize shading.
2. Attain high-efficiency building certifications.
 - Design for LEED Gold, where appropriate.
 - Where appropriate, pursue the Designed to Earn ENERGY STAR® certification.

¹ See [USGC's Benefits of Green Building](#), citing a 2011 U.S. Department of Energy report, *Re-Assessing Green Building Performance: A Post Occupancy Evaluation of 22 Buildings*, available at [Pacific Northwest National Laboratory website](#).

3. Exceed Virginia code requirements.
 - Use design concepts that exceed Virginia code requirements and conform with industry best practices for energy and water efficiency.
 - Use building materials and components that exceed Virginia code requirements for energy and water efficiency.
4. Explore the feasibility of incorporating renewable energy systems.
5. Deploy infrastructure needed to support alternative-fueled vehicles, including electric vehicles (EVs).
 - Encourage provision of or readiness for charging stations and related infrastructure for EVs.
 - Explore the feasibility of providing EV charging stations for public use.

Focus Area: Innovative Energy Solutions



Fairfax County Water Reuse Facilities

This focus area affirms the county's commitment to of developing and applying innovative approaches to achieve environmental and energy objectives. Examples include the county's waste-to-energy operations, its landfill gas recovery and re-use initiative, and its use of reclaimed non-potable water for irrigation and other uses. These types of initiatives yield energy or water savings, are associated with reduced emissions, and have other benefits. Their success reflects a willingness both to look for opportunity and benefit in what others might see as problems, and to consider and incorporate appropriate technologies in developing solutions.

Goal:

Reduce fossil fuel consumption through the application of innovative concepts and technologies.

Target:

Implement a rooftop solar pilot project at the Springfield Warehouse capable of generating electricity equivalent to the warehouse's expected annual electricity consumption.

Actions:

1. Explore opportunities to recover waste heat and energy from county facilities and processes.
2. Explore the feasibility of installing renewable energy systems at county facilities.
3. Research emerging uses for county waste and wastewater, including organic waste.
4. Consider the feasibility of low/net-zero approaches for new county facilities.
5. Participate in joint initiatives with public- and/or private-sector partners that encourage energy-related innovation.
 - Develop demonstration projects that can be viewed by the public and presented to the Board.
6. Encourage staff interest in technological developments that save energy and reduce greenhouse gas emissions.

Focus Area: Electric Vehicles



This focus area supports the continued transition from gasoline-powered passenger vehicles used in the performance of county responsibilities to hybrid-electric and electric vehicles (EVs). This transition has been underway for several years in response to the county's interest in cleaner and more energy-efficient vehicles. In FY2018, the county fleet included 118 hybrid-electric passenger vehicles.

Goal:

Minimize energy used in the transportation of county staff and goods and the delivery of services.

Target:

By 2025, ensure that Level 2 charging infrastructure is installed at up to 20 major government facilities and that by 2030 5% of government passenger vehicle purchases are electric or plug-in hybrid.

Actions:

1. Reduce reliance on petroleum-based fuels by acquiring highly-efficient and alternative-fueled vehicles.
2. Deploy infrastructure needed to support alternative-fueled vehicles, including electric vehicles.
3. Where feasible, implement scheduling and routing practices that reduce vehicle travel time.
4. Implement video conferencing solutions that reduce the need for vehicle travel.

Focus Area: Goods and Services

Fairfax County spends over \$700 million annually on goods and services. The county's Environmentally Preferable Purchasing Policy (EPP Policy), an internal procedural memorandum adopted in 2009, encourages county departments to consider the environmental impacts of the goods and services they purchase without compromising on quality or cost. Such purchases are intended to help conserve natural resources, reduce waste, protect public health and the environment, and promote the use of clean technologies, recycled materials, and less toxic products. This focus area re-affirms the county's commitment to environmentally preferable procurement.



Goal:

Encourage and increase the purchase of environmentally preferable products and services. Consider environmental impact when disposing of property.

Target:

By 2020, require that all major appliances, such as refrigerators and televisions, are ENERGY STAR-certified or equivalent, unless it can be shown that an energy-efficient option is not available. Continue to require that all electronic office equipment, such as computers, monitors and multifunction devices, purchased be ENERGY STAR-certified or equivalent, unless it can be shown that an energy-efficient option is not available.

Actions:

1. Purchase and use products and services that reduce negative environmental effects on employees, the community, and the environment.
2. Require contractors to use environmentally preferable products and practices in performing services for Fairfax County Government, where practical.
3. Purchase products that include recycled content or are made of materials that can be recycled, are durable, conserve energy and resources and have the fewest toxic compounds.
4. Purchase from suppliers that reuse, take back and/or recycle the product purchased.
5. Use best value principles in purchasing decisions by balancing required product performance, price, and the environmental benefit of the product.
6. Establish a funding mechanism to offset cost premiums associated with energy- or water-efficient products and products with recycled content.
7. Create a process by which new contracts and small purchases must be evaluated against criteria established for Environmentally Preferable Goods and Services.

Focus Area: Waste Management

In addition to offering environmentally-responsible waste recycling and disposal options to residents, Fairfax County strives to be environmentally responsible in its own waste management operations. This focus area recognizes that the three “R’s of recycling – “reduce, re-use, and recover” – can save money, energy and natural resources, and encourages efforts across county operations to reduce, re-use and recover resources as alternatives to disposal.



Glass Crusher at I-66 Transfer Station

Goal:

Optimize resource conservation through recovery and reuse.

Target:

Build on the county’s 2016 recycling rate of 50% by diverting at least 3% more waste by 2030.

Actions:

1. Develop and implement a recycling program for construction/demolition debris (CDD), including public outreach and education to promote CDD source reduction and reuse.
2. Expand county composting operations to address organic waste.
3. Capture gas generated by closed landfills.
 - Convert captured landfill gas into natural gas and electricity for county use or sale.
 - Use captured landfill gas for incineration and other processes.
4. Reclaim treated wastewater and sewage sludge.
 - Use reclaimed wastewater for process cooling and irrigation
 - Use sewage sludge for fertilizer application.
5. Generate energy from waste.
 - Support waste-to-energy initiatives.
 - Support energy production using bio-solids combustion.
6. Use renewable energy in support of waste process applications.
7. Promote and expand “reduce, reuse, recycle” initiatives that encourage source reduction and recycling by county employees.

Focus Area: Awareness and Engagement



Visitors at FEEE's 2018 Green Lounge

Fairfax Employees for Environmental Excellence (FEEE) serves as Fairfax County's employee green team. FEEE strives to foster a greener workplace culture by encouraging employees to participate in existing environmental programs, including recycling, green purchasing, and the reuse of surplus county property, and to identify new opportunities for minimizing the county's environmental impact. This focus area supports the efforts of county departments and agencies, either in conjunction with FEEE or on their own, to inspire and empower employees to exercise environmental responsibility, particularly with respect to energy use.

Goal:

Foster a culture of efficiency and conservation in the county workplace.

Target:

FEEE will hold at least four employee events per year.

Actions:

1. Publicize efficiency and conservation actions in the workplace.
 - Provide content on a regular basis to communications channels like *NewsLink*, Fairfax County Energy News, department newsletters, and the FEEE blog.
2. Conduct regular training to enhance employee awareness and to encourage action.
 - Educate staff responsible for purchasing decisions on the benefits of energy- and water-efficient goods and services.
 - Sponsor lunch-and-learns on a range of efficiency and conservation topics.
3. Establish reward and recognition programs to motivate behavior change.
4. Designate champions within departments or facilities who will foster communication and encourage efficiency and conservation.
5. Increase employee awareness of opportunities for source reduction, reuse and recycling
 - Encourage zero-waste events at county facilities.
6. Publicize county policies and procedural memoranda that pertain to energy or water use in the work environment.

Focus Area: Utility Cost Management

This focus area is unique among the 10 areas in that it relates solely to reducing energy costs. Electricity costs in particular can reflect choices made over time, from pre-occupancy load estimates that determine the size of electrical facilities installed by the utility, to the specific rate schedule selected for day-to-day power needs. This focus area encourages thoughtful consideration of possible actions and choices that can affect electricity and other utility costs.

Goal:

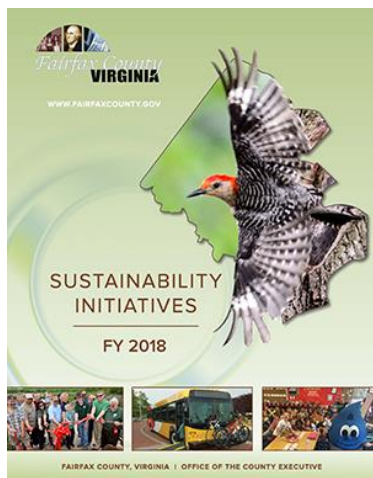
Manage electric and other utility service and load to achieve cost savings.

Target:

Quarterly review of utility cost management best practices by the Energy Core team.

Actions:

1. Coordinate among agencies to ensure that utility electrical facilities are appropriately sized.
 - Agencies should coordinate on the preparation of utility load letters and letter supplements to ensure that the electrical facilities that will be used to provide service are appropriately sized.
2. Coordinate among agencies to ensure appropriate metering and rate-schedule selections.
 - Agencies should coordinate on metering issues including functionality, type, number and opportunities for sub-metering.
3. For accounts with demand charges, implement programs to minimize peak charges.
 - Manage electricity use to minimize peak demand charges and reset billing ratchets, where possible.
 - Use the facility's demand profile to help develop a strategy for reducing peak use.
4. Periodically review utility bills for possible cost savings.
 - Use rate comparisons, bill audits and other tools such as EnergyCap to evaluate the cost of service under alternate rate schedules.
 - Renegotiate contract demand and/or contract dollar minimum with the electric utility in the event of a permanent load reduction.
 - Consider interruptible natural gas service where appropriate.
5. Install meters for sewer credit on cooling towers and irrigation systems if appropriate.



Focus Area: Reporting and Collaboration

Consistent with the county's interests in accountability and transparency, this focus area ensures that the Board and public will remain informed about operational energy efforts as well as progress in achieving county objectives, including the objectives of the Climate and Energy section of the 2017 Environmental Vision. The inclusion of collaborative efforts emphasizes that achieving these objectives is not the responsibility of one department or agency alone; instead, county government leadership, management, and employees will need to work together to successfully implement this Strategy.

Goal:

Communicate the county's progress to the community and wider audiences.

Target:

Progress in achieving the targets and goals of the Operational Energy Strategy will be reported annually by the Environmental and Energy Coordinator in the *Sustainability Initiatives* publication and in a presentation to the Board of Supervisors Environmental Committee.

Actions:

1. Periodically update the Board and public on progress made in implementing the Energy Strategy for county operations with the parameters of that reporting to be guided by the Board's Environmental Committee.
2. Maintain and update county webpages highlighting accomplishments in energy efficiency and conservation.
3. Work with agency staff to develop energy plans tailored to specific activities or functions.
4. Continue to seek opportunities to collaborate regionally on energy and water challenges and to promote resulting achievements.
 - Participate in regional task forces and workshops.
5. Participate in educational conferences and other public events.



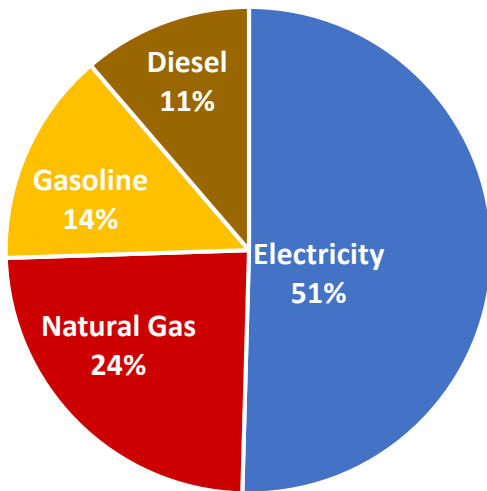
APPENDIX 1: ABBREVIATIONS AND ACRONYMS

Board:	The Fairfax County, Virginia, Board of Supervisors.
Btu or BTU:	British Thermal Unit, a traditional unit of heat defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.
CO ₂ e:	“Carbon dioxide equivalent,” or CO ₂ e, is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO ₂ e signifies the amount of carbon dioxide (CO ₂) that would have the equivalent global warming impact.
EECCC:	Fairfax County’s inter-agency Energy Efficiency and Conservation Coordinating Committee.
GHG:	Greenhouse gas, which absorbs and emits radiant energy within the thermal infrared range.
kWh:	Kilowatt hour, which is a composite unit of energy equivalent to one kilowatt of power sustained for one hour.
LED:	Light-emitting diode, a lighting technology.
LEED®:	Leadership in Energy and Environmental Design, a green building certification program developed by the non-profit U.S. Green Building Council.
M:	Million
MT:	Metric Tons
USGBC:	U.S. Green Building Council, a non-profit entity.

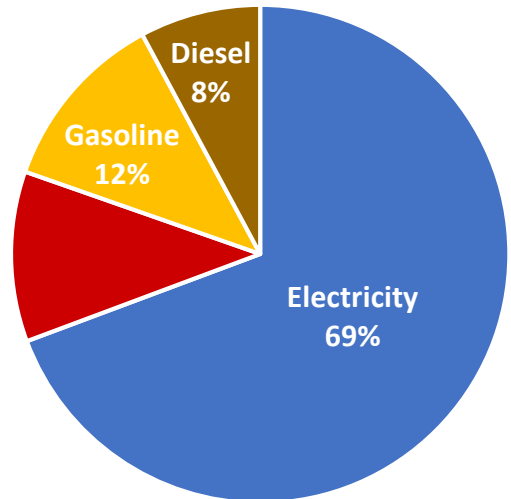
APPENDIX 2: FAIRFAX COUNTY 2016 ENERGY DATA

	Quantity	Unit	kBtu	Cost	lbs CO ₂
Electricity	261,720,286	kWh	892,989,617	\$ 19,890,742	224,185,148
Natural Gas	4,258,482	Therms	425,848,198	\$ 3,172,569	49,824,239
Gasoline	2,091,523	Gallons	251,978,313	\$ 3,383,222	40,993,849
Diesel	1,452,299	Gallons	199,621,347	\$ 2,251,894	32,531,489

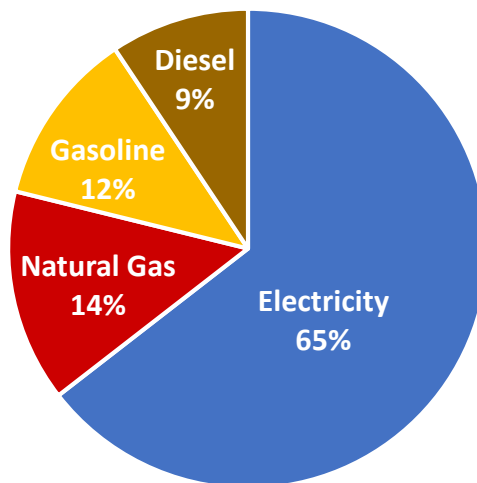
2016 Energy Use (kBtu) by Fuel Type



2016 Energy Cost (\$) By Fuel Type



2016 CO₂ (lbs) by Fuel Type



APPENDIX 3: ESTIMATED ENERGY SAVINGS AND COST AVOIDANCE

Table 3.1 FOCUS AREA: ENERGY USE AND EFFICIENCY

Target Range	Annual Cost	Annual Energy Savings	Annual Utility Cost Avoidance	Simple ROI	Lifetime Utility Cost Avoidance	Equivalent Emissions Reduction (CO ₂ e) Lifetime
Reduce Energy Use 10% by 2029	\$2.24M for 10 years	132M kBtu	\$3.67M	5-7 years	\$41.16M over 10 years	249,476 MT
Reduce Energy Use 20% by 2029	\$4.49M for 10 years	264M kBtu	\$7.35M	5-7 years	\$82.31M over 10 years	501,673 MT

Assumptions and Notes:

- Data is based on standard LED lighting retrofits, which have a useful life of about 10 years.
- 2.5% escalation in electric rate was used to calculate lifetime cost avoidance.

Table 3.2 FOCUS AREA: GREEN BUILDINGS

Target Range	Initial Cost	Annual Energy Savings	Annual Utility Cost Avoidance	Simple ROI	Lifetime Cost Avoidance	Equivalent Emissions Reduction (CO ₂ e) Lifetime
LEED V4 Silver	\$0.31M	3.56M kBtu	\$56,000	5.5 years	\$2.48M over 30 years	16,002 MT
LEED V4 Gold	\$1.39M	5.91M kBtu	\$110,000	12.5 years	\$4.96M over 30 years	30,336 MT

Assumptions and Notes:

- Actual energy usage, savings and emission reductions are compared to ASHRAE 90.1 version 2010.
- Lifetime cost avoidance include annual savings escalated over 30 years at 2.5% and maintenance costs.
- Operations and maintenance costs for achieving LEED v4 are assumed at 1% of initial cost for renewable energy sources but will need to be further evaluated in future projects.
- Additional credits to maintain LEED Silver to be achieved via combination of renewable energy, enhanced commissioning and innovation in design credits.
- Initial costs and savings for renewable energy sources do not include realization of tax credits.

Table 3.3 FOCUS AREA: INNOVATIVE ENERGY SOLUTIONS

Target Range	Initial Cost	Annual Energy Savings	Annual Utility Cost Avoidance	Simple ROI	Lifetime Utility Cost Avoidance	Equivalent Emissions Reduction (CO ₂ e) Lifetime
Pilot Project at Springfield Warehouse	\$1.25M	819,627 kWh	\$70,094	16-18 years	\$2.2M over 25 years	14,515 MT
2% Onsite Renewable Energy by 2030	\$8.7M	5.2M kWh	\$471,097	18 years	\$12M over 20 years	67,905 MT
5% Onsite Renewable Energy by 2030	\$21.7M	13M kWh	\$1.18M	18 years	\$30.1M over 20 years	169,761 MT

Assumptions and Notes:

- Solar PV estimates were based on contractor-provided information.
- Solar projects are predicated on a thorough structural and electrical assessment.
- Other than the pilot project which has a brand-new roof, solar PV lifetime is based on a 20-year roof life.
- 2.5% escalation in electric rate was used to calculate lifetime cost avoidance.

Table 3.4 FOCUS AREA: ELECTRIC VEHICLES

Target Range	Initial Cost	Annual Fuel Savings	Annual Gasoline Cost Avoidance	Simple ROI	Lifetime Cost Avoidance	Equivalent Emissions Reduction (CO ₂ e) Lifetime
Level 2 Charging Station per Major Facility (20) by 2030	\$1,000,000					
5% of Passenger Vehicle Purchases Plug-In EV by 2030	\$181,288	12,852 gallons	\$93,500			1,265 MT
10% of Passenger Vehicle Purchases Plug-In EV by 2030	\$373,240	26,460 gallons	\$192,500			2,604 MT
15% of Passenger Vehicle Purchases Plug-In EV by 2030	\$559,860	39,690 gallons	\$288,750			3,905 MT

Assumptions and Notes:

- DVS will incentivize departments to purchase EV or plug-in EV. The initial cost reflects the difference between a fuel vehicle and an electric vehicle. Also, the number reflects a modest growth in passenger vehicles.
- 20 "major" County facilities would receive a charging station. Estimated cost includes charger, power management system, controller power panels and access to the Fuel Force system for tracking. Cost does not include permits and may change significantly based upon location of electrical panels.
- Commercial charges will increase because staff is not currently trained on the maintenance of electric vehicles. Education and additional equipment will be required for staff to maintain electric vehicles at County facilities, but estimates are not currently available.
- ROI assumes regular unleaded fuel is \$1.96/gal and electricity is \$0.08/kWh.
- U.S. Department of Energy Calculator assumes the Greenhouse Gas Emissions for a regular gasoline vehicle (Ford Fusion) is 5.9 tons per year and a plug-in hybrid (Ford Fusion) is 2.1 tons per year.

APPENDIX 4: ESTIMATED EMISSIONS DATA

Table 4.1 COOL COUNTIES COMPARISON (GOAL = 80%)

Focus Area	Recommended Target	% of Regional 2005 GHGs	% of County 2005 GHGs	% of County Operations 2005 GHGs
Energy Use and Efficiency	20% reduction by 2029	0.07%	0.34%	23.0%
Green Building	LEED Silver V4	0.001%	0.004%	0.25%
Innovative Energy Solutions	Pilot Large Scale On-Site Solar	0.001%	0.004%	0.25%
Electric Vehicles	EV Charging Stations at 20 Major County Facilities and 5% EV Passenger Vehicle Purchase	0.0002%	0.001%	0.06%

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