



Energy Management Program

Fiscal Year 2019-2020

Annual Report



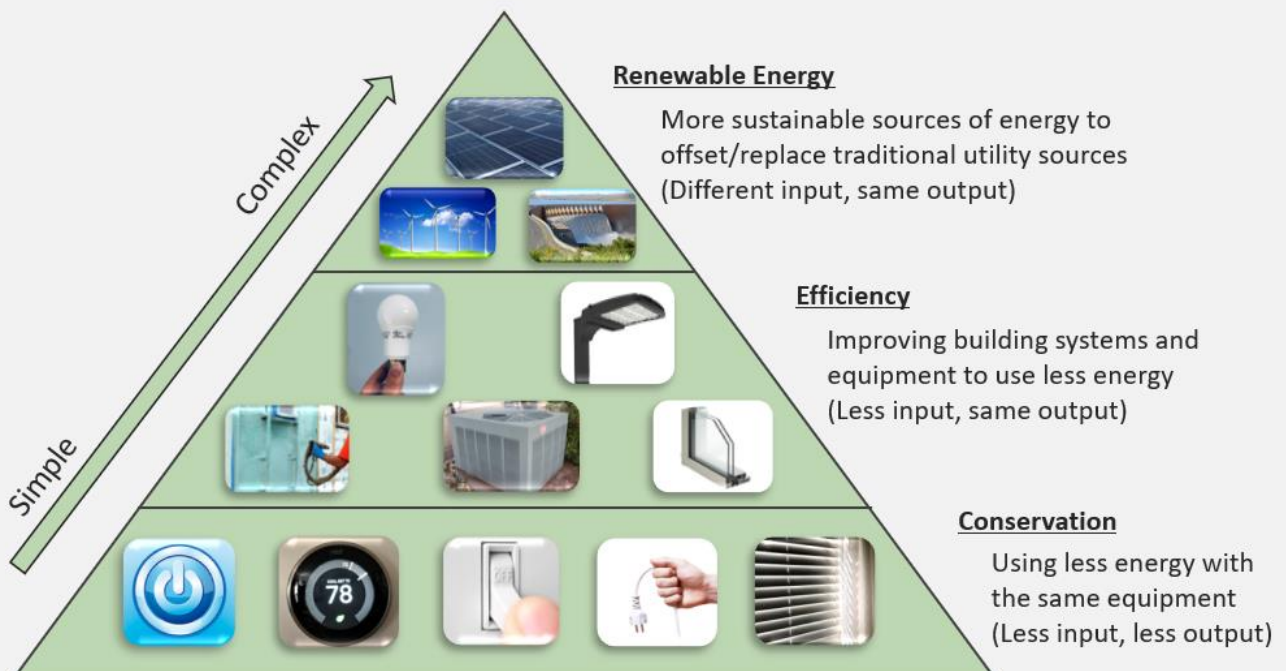
Overview

The Energy Management program promotes energy conservation, efficiency, and renewable energy in county facilities, to reduce energy resource use and associated costs within the government, public schools, and public utilities.

These efforts include:

- Tracking and benchmarking energy use and cost in county facilities;
- Fostering a culture of conservation in the county;
- Identifying and implementing energy efficiency projects;
- Promoting the transition to renewable energy sources;
- Supporting green building efforts for capital projects;
- Pursuing available energy grants and rebates;
- Managing energy utility accounts and rates;
- Community outreach for energy and sustainability awareness.

The Energy Management program prioritizes conservation, then efficiency, then renewable energy as shown below in the “energy pyramid”



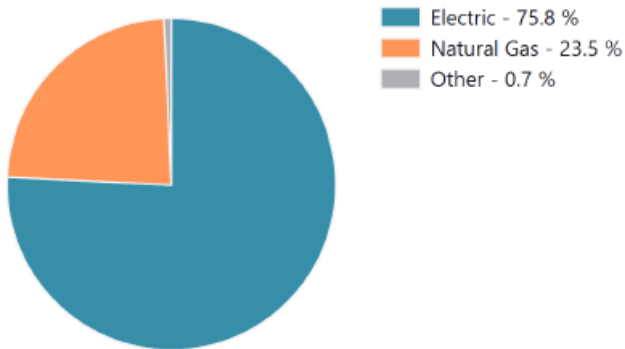
Totals – County Wide

Fiscal year 2020 county-wide energy use and cost information from the county's Energy CAP software is summarized below. This totals data from nearly 1,000 energy accounts serving 350 county facilities.

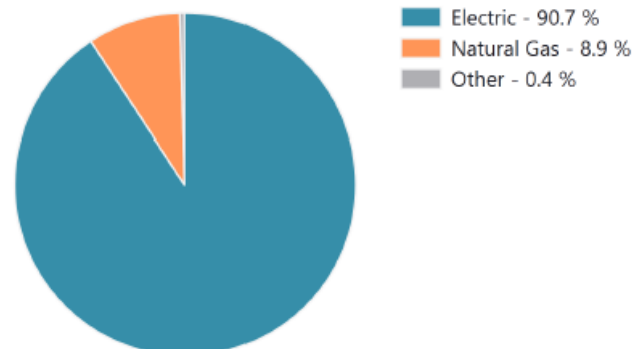
For FY20, Public Utilities facilities used 25%, Government facilities used 31%, and Public Schools facilities used 44% of total county energy use.

Utility grid electricity makes up the majority of the county's total energy use and cost, with natural gas, diesel, propane, and solar photovoltaic (PV) electricity making up the remainder.

Energy Use Percentage



Cost Percentage



Commodity	Use	Unit Cost	Total Cost
Electricity	228,367,621 kWh	\$0.087/kWh	\$19,761,424
Natural Gas	2,346,636 CCF	\$0.823/CCF	\$1,931,583
Diesel Fuel	36,828 Gallons	\$1.698/Gallon	\$62,543
Propane	16,961 Gallons	\$0.935/Gallon	\$15,864
Solar PV	240,242 kWh	\$0.070/kWh	\$16,817
Total			\$21,788,231

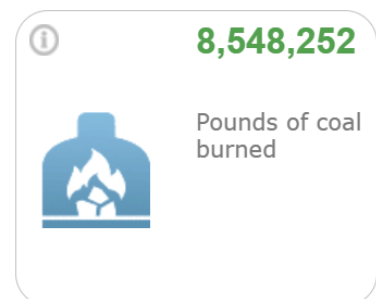
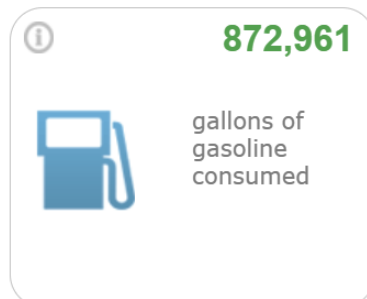
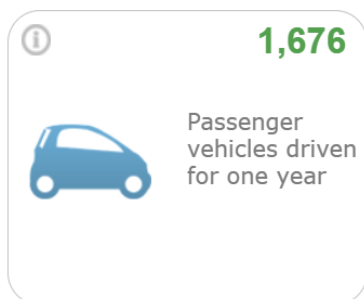
Benchmarking – County Wide

Energy benchmarking normalizes energy use or cost over a set time period for comparison to other periods of time, to peers, and/or to national averages. In building energy use benchmarking, all energy sources are totaled and converted to thousands of British Thermal Units (kBtu), then divided by building square footage (SF). The resulting metric is called energy use intensity (EUI). Total energy cost can likewise be divided by area to determine energy cost intensity (ECI). The goal of the Energy Management program is to reduce EUI and ECI each year despite county growth. Using Energy CAP software implemented in 2018, FY 2019 represented a new baseline year for county-wide benchmarking.

It should be noted that in the 4th quarter of FY 2020, COVID-19 significantly affected County operations, with most of the year's energy use and cost reduction occurring from March to June due to reduced building occupancy.

Key Metric	FY2019	FY2020	Difference	% Difference
Total Energy (kBtu)	1,098,644,590	1,028,384,580	70,260,010	6.4% ↓
EUI (kBtu/SF)	100.07	93.21	6.85	6.8% ↓
Total Cost	\$23,180,902	\$21,788,231	\$1,392,671	6.0% ↓
ECI (\$/SF)	\$2.11	\$1.97	\$0.14	6.5% ↓
Carbon Emissions (metric tons CO2)	128,486	120,728	7,758	6.0% ↓

Carbon footprint is a new metric being tracked with the help of Energy CAP. By implementing emission-free solar renewable energy and energy efficiency projects, greenhouse gas emissions were reduced by 7,758 metric tons (carbon dioxide equivalent) in the last year. According to the U.S. Environmental Protection Agency Greenhouse Gas Calculator, the avoided emissions equate to removing 1,313 homes' use of electricity from the grid for a year. Other equivalencies for the reduction:



FY 2020 Initiatives

County-wide

- Published Go Green Henrico website - <https://henrico.us/go-green/>
- Ongoing evaluation and optimization of electricity rates
- LEED green building support for 6 projects seeking certification
- Participated in demand response to earn rebates for energy efficiency projects and emergency energy curtailment
- Continue to explore solar feasibility for additional county facilities
- Served as a resource to all county ESMS teams for energy data

Government

- Completed 10 capital improvement projects (see page 6-7)
- Completed the county's first two rooftop solar systems at Libbie Mill Library and Mental Health East Center (see page 8)
- Initiated rooftop solar project design at Public Safety Building

Schools

- Initiated rooftop solar project designs at 3 new schools
- Facilitated Dominion streetlight upgrade at Chamberlayne ES



Public Utilities

- Explored utilizing biogas from the WRF as a commodity
- Worked on process to collect and import water and sewer data into Energy CAP

General Services CIP Energy Projects

Funding as of 7/1/2019:	\$467,014
Encumbered Costs FY20:	\$125,306
Ending balance 6/30/2020:	\$341,708

Project	Project Cost	Annual Savings Projected	Return on Investment (years)
Mental Health East Center Electrical Modifications	\$13,184	\$0	N/A*
Human Services Building Loading Dock Lights	\$684	\$171	4.0
Deep Run Rec Center Interior/Exterior Lights	\$1,583	\$2,287	0.7
Firehouse 15 Interior/Exterior Lights	\$13,373	\$3,093	4.4
Cultural Arts Center Exterior Lights	\$27,710	\$8,467	3.3
Firehouse 16 Interior/Exterior Lights	\$17,726	\$4,812	3.7
Admin and Annex Canopy Lights	\$27,705	\$6,065	4.6
Firehouse 17 Interior/Exterior Lights	\$18,791	\$4,542	4.1
Dominion streetlights CAM West	\$1,325	\$1,148	1.2
Dominion streetlights CAM East/EGC/DPW	\$3,225	\$1,718	1.9
	\$125,306	\$32,303	2.7

* Modifications to receive solar system – solar project financials on page 7

General Services CIP Energy Projects

Administration Complex Canopy Lights Before and After



Human Services Building Loading Dock Before and After



Firehouse 16 Gear/Shop Room Before and After



Solar Renewable Energy Projects

Henrico PRMS Video on Solar Projects:

<https://www.youtube.com/watch?v=j6goFM4umDw>

Links to real-time solar production (open solar links using Google Chrome):

<https://henrico.us/genserv/energy-management/>

Mental Health East Center

System Size:

680 solar panels/272 kW

Projected Savings:

\$ 9,276 first year

\$300,000 over 25 years

Started: May 2019

Completed: December 2019



Libbie Mill Library

System Size:

306 solar panels/122 kW

Projected Savings:

\$ 4,578 first year

\$150,000 over 25 years

Started: May 2019

Completed: December 2019



Green Building

Henrico County uses the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) green building rating system to certify major capital projects as “green buildings”.

- 16 LEED certified projects since 2011
- 6 projects currently pursuing certification
 - Mental Health East Center
 - Fairfield Area Library
 - Firehouse 20
 - Tucker High School
 - Highland Springs High School
 - Addition to Holladay Elementary School

Henrico Interactive LEED Map:

<https://henrico.maps.arcgis.com/apps/MapTour/index.html?appid=aef5d1ea72b84853b4287be5b0a5b38f>



HENRICO COUNTY'S LEED CERTIFIED PROJECTS



Holman MS - Silver 2011



Glen Allen HS - Gold 2011



Glen Allen Library - Silver 2012



Firehouse 12 - Gold 2012



Firehouse 13 - Gold 2013



Eastern Rec Center - Silver 2014



Gayton Library - Silver 2014



Kaechele ES - Silver 2014



Firehouse 7 - Silver 2014



East Health Clinic - Gold 2015



Firehouse 3 - Silver 2016



Firehouse 10 - Gold 2016



Libbie Mill Library - Silver 2017



Varina Area Library - Silver 2017



Firehouse 9 - Gold 2017



Firehouse 19 - Gold 2019



Outreach and Recognition

Energy Fairs

- Fall 2019 – Western Government Center
- Spring 2020 – Postponed until 2021 due to COVID-19



Presentations

- HCPS Teacher Workshop – Energy Management Program – August 2019
- Varina Area Library EcoFair – Green Homes – September 2019
- Libbie Mill Library Solar Kickoff – September 2019
- USGBC Virginia - Fairfield Area Library Green Features – November 2019
- Varina Women's Club – Green Homes – February 2020

News

- VPM, October 2019 - <https://vpm.org/news/articles/7421/henrico-county-launches-solar-power-for-its-own-buildings>
- WRIC, December 2019 – <https://www.wric.com/news/local-news/henrico-county/henrico-officials-hope-solar-panels-help-county-save-money-while-going-green/>

Awards

- NACO Award - “Savings and Sustainability with Solar Renewable Energy”
- VSBA Green Schools Challenge – HCPS achieved Certified
- USGBC Virginia Green Building Leadership Award – Firehouse 19
- Virginia Energy Efficiency Council Leadership Award – Henrico's LEED Program

Revenue, Savings, and Cost Avoidance

FY 2019-2020

FY 2020	Total \$
Demand Response Rebates	\$ 33,338
Energy CIP Project Savings	\$ 32,303
Electricity Rate Change Savings	\$ 213,300
Solar PV Projects	\$13,854
FY 2020 Total	\$292,795

Cumulative Over Life of Energy Management Program

2003-2020	Total \$
Total Grants	\$ 3,544,961
Total Rebates	\$ 1,656,384
Cumulative Avoided Costs/Savings	\$ 19,081,053
Program Cumulative Total	\$24,282,398

What's Next?

Plans for FY 2021 include:

- Expanding the demand response program for additional rebates:
 - Added 4 schools, 1 DPU facility, and 1 government facility
- Energy efficiency project opportunities:
 - North Park Library (pictured)
 - Tuckahoe Library
 - Twin Hickory Library
 - Firehouses 5 and 14
 - Western Government Center
 - DPU Operations Center
- Energy fairs:
 - Virtual activities/resources planned - October 2020
 - Energy & Earth Day event at Fairfield Area Library planned - April 2021
- LEED certification anticipated:
 - Mental Health East Center
 - Fairfield Area Library
- Solar renewable energy projects in design:
 - Public Safety Building
 - Tucker High School
 - Highland Springs High School
 - Addition to Holladay Elementary School

