Virginia Association of Counties

ACHIEVEMENT AWARDS

APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 1, 2020.** Please include this application form with electronic entry.
If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact Gage Harter.

PROGRAM INFORMATION

County: County of Henrico

Program Title: Savings and Sustainability with Solar Renewable Energy

Program Category: Environmental

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

Name: Brandon Hinton

Title: Deputy County Manager for Administration

Signature:

Program Overview

Henrico County completed its first two rooftop solar photovoltaic (PV) systems at Libbie Mill Library and the Mental Health and Developmental Services East Center in 2019. A solar power purchase agreement (PPA) financing model was utilized to make these projects possible. At no cost to the county, a solar provider designed, installed, and will maintain the systems. If these systems had been purchased outright, they would have likely cost over $1 million.

This program began with Henrico County's long-standing commitments to green building and energy management. Both the Libbie Mill Library and the Mental Health East Center are green buildings, designed to Leadership in Energy and Environmental Design (LEED) standards to use substantially less energy than "standard" buildings that just meet the minimum energy code. Commissioning and good facility management ensure those buildings are operated sustainably and efficiently to follow through with the design intent. Once conservation and efficiency have been addressed, then renewable energy should be considered.

The Libbie Mill Library PV system consists of 306 solar panels with a direct current (DC) capacity of 122 kiloWatts (kW). The system is expected to produce 186,000 kWh of electricity its first year which would offset approximately 25% of the annual electricity use of this large, three-story library. The Mental Health East Center PV system consists of 680 solar panels with a DC capacity of 272 kW. The system is expected to produce approximately 375,000 kWh of electricity its first year which might offset the entire annual energy use of this all-electric, one-story building. In Virginia, net-metering allows the solar electricity to be "banked", such that if the system produces more than the building is using on a given day, that amount is credited to offset a day when building consumption is more than system production. This gets balanced out by the utility company on

an annual basis, and if the annual solar production is equal to or greater than the annual consumption of the building, it will be considered net-zero energy.

Over the 25-year term of the agreements for these two projects, they are projected to save a total of approximately $450,000 in electricity costs. At the end of the 25-year term, Henrico County will have the options to either extend the contracts, purchase the solar systems for a buyout price, or have the systems removed at no cost to the county. The projects were a partnership between Henrico's Department of General Services, Henrico County Public Libraries, Henrico Mental Health and Developmental Services, and Sun Tribe Solar.

Problem/Challenge/Situation Faced by Locality

County buildings and operations consume a great deal of energy, and Henrico County's Energy Management program works to reduce energy use and cost, and to promote sustainable design, construction, and operation of county facilities to reduce environmental impact. This is accomplished through strategies such as diligent energy data tracking, conservation and efficiency education, meeting green building standards on new construction, and implementing efficiency projects such as lighting and HVAC upgrades. The county wanted to grow the program by adding renewable energy, however the capital costs for large systems was prohibitive, until the county became aware of solar PPAs as a financing mechanism. Under this model, a solar provider installs their system on a county facility and sells the renewable electricity to the county at a lower price than grid electricity, thus avoiding upfront capital costs and long-term maintenance costs, but still delivering savings on electricity bills. Energy-intensive operations put a burden on the utility grid and increase environmental impacts caused by energy generation. Transitioning to distributed (on-site) renewable energy helps to ease the demand on the grid and reduces the county's carbon footprint.

How Program Fulfilled Awards Criteria

By utilizing a PPA model, Henrico County has been able to incorporate on-site renewable energy at no cost to the county and with the net result of savings on electricity costs. The county avoided approximately $1 million in up-front capital costs and will be saving a projected $450,000 in electricity costs over the next 25 years. Increasing use of renewable energy also supports the county's commitment to improving environmental sustainability in county operations and facilities. Distributed renewable energy projects reduce reliance on grid electricity, which reduces regional greenhouse gas emissions, improves air quality, and improves grid resiliency. The Henrico Energy Manager works closely with energy and sustainability staff from other Virginia cities and counties, and has shared resources and experience with other localities looking to implement solar renewable energy.

How Program Was Carried Out

Henrico County performed a solar feasibility evaluation in 2018 to identify the county government facilities that were the best candidates, based on variables such as building orientation, roof age, roof area, shading, structure, electricity rates, and total electricity use. It is important to consider roof age and condition, since ideally the roof should outlive the solar system to avoid having to remove the system to replace the roof. Available south-facing roof area that is not shaded by trees, other roof sections, or rooftop equipment is also an important consideration so the system can be sufficiently sized to provide favorable economy of scale.

The facilities that were deemed to have the best potential for solar were included in a September 2018 request for proposals (RFP) for a solar PPA. A selection committee evaluated the three proposals received, and selected Sun Tribe Solar to implement Henrico County's first two solar projects. The designs for the two rooftop systems began in early 2019 and installations were

completed in December 2019. As of 2020, the two systems are operating and generating renewable energy for these buildings.

Financing and Staffing

The cost of the program for the county was limited to administrative time to evaluate project feasibility, conduct the RFP process, and oversee the implementation of the projects. There were also minor modifications that needed to be made to the electrical systems at the Mental Health East Center to accommodate the addition of the solar system. The Libbie Mill Library required no modifications to receive the solar system.

The Solar PPAs themselves carry no upfront capital costs or long-term maintenance costs for the county. This includes all aspects of system design and installation including layout, electrical engineering, permitting and inspections, mobilization, construction, roof warranty coordination, and coordination with the electrical utility company. It also includes long-term system operation, monitoring, annual inspections and cleaning, and troubleshooting and repair if necessary. Those expenses are all wrapped into a PPA rate that the customer pays the solar provider, billed per kWh of the system's solar electricity production. PPA rates in Virginia recently are typically equal to or lower than the per kWh cost of grid electricity, so the net effect on energy costs is no cost or negative cost (savings).

For Henrico County's first two PPA projects, the result is saving on energy costs. The average blended rate of grid electricity is $0.08/kiloWatt hour (kWh) for the Libbie Mill Library, and $0.10/kWh for the Mental Health East Center. Grid electricity rates have historically escalated between 2 and 3% annually in recent years in Henrico County. The PPA rate for the renewable electricity generated by the two solar systems is $0.07/kWh with a 2.5% annual escalator.

Therefore, money is being saved on electricity costs from the very beginning of solar production. Over the 25-year contract term, the Libbie Mill system is projected to save $150,000 and the Mental Health East Center system is projected to save $300,000. These savings may vary depending on how grid electricity rates escalate in the future; however, they have been conservatively estimated.

Program Results

Henrico County's first two solar projects have been very well-received by stakeholders, county leadership, and constituents. The combination of avoiding approximately $1 million in up-front capital costs and saving a projected $450,000 in electricity costs over 25 years makes this program a huge success.

In addition to the monetary savings, transitioning to renewable energy benefits the environment and improves resiliency by decreasing reliance on grid electricity. In Virginia, utility grid electricity is primarily produced from burning fossil fuels (coal and natural gas) which creates greenhouse gas emissions and negatively impacts air quality. According to the U.S. Environmental Protection Agency Greenhouse Gas Equivalencies calculator, the electricity produced by these two solar systems in their first year alone will avoid 398 metric tons of carbon dioxide emissions, which is equivalent to taking 85 cars off the road for a year, or removing 67 homes' worth of electricity from the grid. Furthermore, high electricity demand can lead to overloading the utility electrical grid and reliability issues. By adding distributed (on-site) renewable energy, customers can help ease demand on the utility grid, which in Virginia tends to peak on extremely hot summer days (coincidentally when solar systems have peak output).

The program has also provided the opportunity for additional outreach and education on energy and renewable energy concepts and issues, which is one of the energy management program's primary purposes. A public kickoff event was held at Libbie Mill Library to give the general public the opportunity to learn more about renewable energy in general, details of these two solar projects, and how the program is a financial benefit to the county and taxpayers. Project sheets have been developed for employees and visitors to see images and information about the rooftop systems. The real-time production can be tracked on a publicly accessibly website at https://portal.solarscada.com/ui/home?autoLoginUsername=PUBLIC_VIEW&autoLoginPassword=PUBLIC_VIEW (open using Google Chrome). Henrico has also been able to share its lessons learned and experience with other Virginia localities looking into solar PPAs, thereby fulfilling another primary purpose to establish Henrico County as a leader in sustainable energy use.

Henrico County is currently planning for the next round of solar PPA projects, to include a government building and three schools, and intends to continue with additional projects as new buildings are constructed or as roof replacements make existing buildings feasible.

Brief Summary

Henrico County completed its first two rooftop solar photovoltaic systems at Libbie Mill Library and the Mental Health and Developmental Services East Center in 2019. The new renewable energy systems expand on the energy efficient design and construction of these buildings. The projects were a partnership between Henrico's Department of General Services, Henrico County Public Libraries, Henrico Mental Health and Developmental Services, and Sun Tribe Solar.

A solar power purchase agreement financing model was utilized to make these projects possible. At no cost to the county, a solar provider designed, installed, and will maintain the systems. If these systems had been purchased outright, they would have likely cost over
$1 million. Henrico County will purchase the renewable energy generated by the systems at a reduced rate compared to grid electricity. Over the next 25 years, these systems are projected to save over $450,000 on electricity costs. The Libbie Mill Library system is expected to offset approximately 25% of the annual electricity use of this large, three-story library. The Mental Health East Center system might offset the entire annual energy use of this all-electric, one-story building.

These solar systems are the beginning of a transition to more sustainable renewable energy sources for Henrico County facilities. Distributed renewable energy systems benefit the environment by reducing carbon emissions, and improve resiliency by decreasing reliance on grid electricity. Thanks to the success of these projects, Henrico is in the process of planning four more solar PPA projects.

Libbie Mill Library Solar System

Project Information

Location:
2100 Libbie Lake East Street
Henrico, VA 23230
Brookland District

System Size:
306 solar panels/122 kiloWatts
kW direct current (DC)

Project Cost: $0
Projected Savings:
$150,000 over 25 years

Start: May 2019
Complete: December 2019

Project Description

Henrico County partnered with Sun Tribe Solar to complete a solar photovoltaic system on the roof of Libbie Mill Library. Libbie Mill is a Leadership in Energy and Environmental Design (LEED) Silver certified green building.

A Power Purchase Agreement (PPA) was signed. At no cost to the county, Sun Tribe Solar designed, installed, and will maintain the system. Henrico County will purchase the renewable energy generated by the system at a reduced rate compared to grid electricity.

Over the next 25 years, Libbie Mill Library is estimated to save $150,000 for Henrico taxpayers while harnessing approximately 25% of its electricity from its new solar system.


LIBRARY

Mental Health East Center Solar System

Project Information

Location:
3908 Nine Mile Road
Henrico, VA 23223
Varina District

System Size:
680 solar panels/272 kiloWatts kW direct current (DC)

Project Cost: $0
Projected Savings:
$300,000 over 25 years

Start: May 2019
Complete: December 2019

Project Description

Henrico County partnered with Sun Tribe Solar to complete a solar photovoltaic system on the roof of the new Mental Health and Developmental Services East Center (MHEC). MHEC is seeking Leadership in Energy and Environmental Design (LEED) green building certification.

A Power Purchase Agreement (PPA) was signed. At no cost to the county, Sun Tribe Solar designed, installed, and will maintain the system. Henrico County will purchase the renewable energy generated at a reduced rate compared to grid electricity.

Over the next 25 years, MHEC is estimated to save $300,000 for Henrico taxpayers while harnessing up to 100% of its electricity from its new solar system.