

Bristol, Tennessee



Photo: Bristol, TN

Bristol

CASE STUDY

SOLAR
OUTREACH



PARTNERSHIP

Bristol, Tennessee

Bristol, a small city in Sullivan County, Tennessee, straddles the Tennessee-Virginia border. In fact, the state line runs down the city's main thoroughfare, aptly called State Street. Bristol, Tennessee, has a population of 26,626, an area of 32 square miles, and a budget of approximately \$106 million; Bristol, Virginia, has a population of 17,341, an area of 13 square miles, and a budget of approximately \$86 million.¹

While they share many organizational attributes, the governing bodies for the two cities are independent. Each city has a council-manager form of government and is governed by a five-member city council, two of whom are elected at-large; both cities have independent planning commissions, zoning ordinances, and industrial development authorities.²

The city of Bristol, Tennessee³, has installed two municipal solar projects: A 200 kilowatt (kW) municipal solar farm located on a capped demolition landfill was commissioned in 2012, and a 50 kW solar pavilion and open-air classroom on the campus of Holston View Elementary School was commissioned in 2014.⁴ While many local governments across the country have installed solar arrays, what makes Bristol notable is the drive of people in both the private and public sectors to seek economic development and opportunity.

Creating a Public and Private Partnership

In many cases, a local government starts with a sustainability plan that outlines specific energy targets and then develops a strategy to implement them. In the case of Bristol, the local government focused on economic development and created the [Strategic Partnerships for Economic Growth and Sustainability](#) Plan in 2012, which it updated in 2013. The 2013 version outlines goals for attracting green industry and advancing STEM (science, technology, engineering, and math) opportunities and programs in schools. Some of the school initiatives also emphasize energy education.



Municipal Solar Farm on a Capped Landfill



Solar pavilion and classroom on the campus of Holston View Elementary School

The city of Bristol was also looking at its energy usage and investigating ways to save money and use less energy. Its school system, for example, was already replacing windows and upgrading heating and cooling systems. According to Mike Sparks, former assistant city manager and economic development director for Bristol, the city had considered installing solar but had not figured out how to make it work financially.

“There was interest, and the Tennessee Valley Authority (TVA) had in place its Generation Partners program (rebranded as [Green Power Providers](#)), so there was a potential for a project. But it had to be cost-effective. Solar projects are expensive, particularly for a small town. There are a lot of front-end costs and a long payout period to make it work. We needed a private company to come up with the initial funding.”

As Bristol was working to meet its goals, [Marti Morenings](#), a local businesswoman, was looking to put solar on her company’s warehouse. When she could not locate a local installer, she saw a potential market and founded [EcoLogical Energy Systems \(EES\)](#) in 2010. EES is a private solar and renewable energy design and installation company. Morenings had also founded Universal Companies, an international distribution company for spa and resort products based in Abingdon, Virginia. Originally based in Abingdon as well, EES relocated to Bristol, Tennessee, to take advantage of exposure to a larger market and Bristol’s co-location in Virginia.

As EES was looking for business and had ideas about partnering with the city, a team of its staff met with local government leaders in 2011 and suggested doing one or more projects on city property. Having previously investigated the idea of installing solar, Bristol’s leaders were interested in partnering with EES but were unsure about locations and about how to make the financing work. So they accepted EES’s offer to examine possibilities. EES surveyed potential publically owned properties, assessing their viability and the availability of appropriate electrical infrastructure. Among the options it presented to the city were local schools, municipal buildings, and a capped demolition landfill.

Municipal Solar Farm on a Demolition Landfill

The Tennessee Department of Environment and Conservation had recently capped the city-owned landfill with a membrane, and many deemed that property unusable. After discussing all options, however, EES and Bristol agreed that the closed landfill was an ideal site for the installation and agreed to build a 200 kW solar farm. As to financing the project, EES researched options and presented a power purchase agreement (PPA) to the city, which Bristol accepted.

Commissioned in April 2012, [the system](#) comprises 819 solar panels and generates approximately 300,000 kW hours of clean, renewable electricity a year. The



Municipal Solar Farm on a Capped Landfill

array provides enough electricity to power about fifty homes in the area and offsets over 6,000 tons of carbon dioxide annually—roughly the equivalent of the emissions of 1,200 cars.

Financing the Project

EES leases the land from the city for \$6,000 annually and sells the electricity generated at the landfill site to TVA via the local energy provider, [Bristol Tennessee Essential Services \(BTES\)](#), for \$0.21/kWh. The contract specifies a twelve-and-a-half-year term of use with another twelve-and-a-half-year extension. After the initial term of the agreement, the kW rate will go down to \$0.01/kWh, but the \$6,000 annual lease fee will stay the same.

While the city admits that the cost savings from the system are not huge—Bristol receives about 10 percent of the revenue generated from the system and EES gets 90 percent—there are other benefits. As Mike Sparks explained, “We like to save any money we can, but the project was also directed towards the idea of doing something significant . . . participating in an effort to see how solar would work. . . . We look at this as giving us some guidance for future projects. Thus far, it’s done very well. I think everybody’s very pleased with it.”

How the Process Worked

According to Nick Safay, EES vice president of operations and development, the permitting process was generally very simple, although installation did require both a building and an electrical permit. Ballasts were designed to handle a ninety-mile-an-hour wind load capacity, and minimal grading was necessary to accommodate the ballasts and panels. Asked to provide assur-

ance that nothing in the landfill would be disturbed and to demonstrate that the array would not exceed voltage requirements, EES had the existing transformer at the site upgraded to handle the load, and it also installed a new generation meter to measure the solar electricity produced at the landfill and fed to the grid.

As Safay noted, “It was just a very smooth process. Honestly, the biggest issue was just getting all the paperwork in line to make sure that the agreements were in place before we could spend the money on all the equipment.” EES monitors the system and is tasked with all associated maintenance, cleaning, regular inspections, grass mowing, etc.

Two additional benefits that made the deal work for all parties was the [30 percent federal tax credit](#) and the ability to move forward with the project without a request for proposals. According to Safay, “Since the city didn’t have to pay anything up front, there was no need for the city to put out a request for proposals, which enabled the project to move quickly.” As soon as EES demonstrated a revenue stream for both its company and the city, the Renewable Energy Management Agreement was put into place and approved. EES procured the equipment and installed the system.



Nick Safay, Ecological Energy Systems

The project has been a real win-win. “It was a good opportunity all around,” said Safay. “It was a revenue stream for EES, and the city of Bristol now generates income from a property that previously had no value. . . . It was also a great way for the city to say ‘hey, we’re going green.’”

The landfill site is also used as an education and training tool. EES and Bristol often take firefighters, professors, students, planning commissions, and other

interested parties out to view the site. Once it was just a landfill; now it’s a source of revenue and a symbol of progressive energy policy that found a home in upper East Tennessee.

Solar Pavilion at Holston View Elementary

The second partnership project between Bristol and EES is a [50 kW solar pavilion](#) installed at [Holston View Elementary School](#). The system is made up of 200 solar panels and generates 68,000 kW a year.

School board director Gary Lilly explained how the project came to be: “The city had previously inquired about installing solar, but those plans fell through, so when Principal Jerry Poteat heard about the landfill array, he contacted EES about building an array.” A solar array fit within the city’s economic development plan, which was to make solar part of a broader STEM curriculum.

Constructing the Array

Using the PPA model, Holston View Elementary was able to install the system at no cost to the school. The school leases the space to the PPA administrator, EcoLogical Energy Leasing, for \$100 per month. As with the landfill array, power generated by the array is fed back to TVA through the local electrical system, BTES. Each month the school receives an energy credit for the power generated and then sends a check for that same amount to EES. Financial payback for the system is expected to take about fifteen years, after which EES plans to donate the system to the school.

The project took shape with the support of all the local government leaders. While a building permit was not necessary, EES did go through the permitting process to ensure that all paperwork was completed and all inspections were scheduled, just as it would with any commercial project. Plans for the array were submitted to the state fire chief for review. Upon review, the fire chief expressed concern that the inverters located on the rear of the solar panels were visibly exposed, so EES installed thin metal sheathing to cover the inverters. Without the metal sheathing, the company would have been required to build a ten-foot fence around the array. While the sheathing inhibits air circulation somewhat, keeping the inverters a bit warmer than the designer would like for optimal production, shielding the inverters and forgoing the fence definitely makes the array more inviting and accessible to the school and surrounding community.



Solar pavilion and classroom on the campus of Holston View Elementary School

The team learned from early missteps with another school system, this one in Hawkins County, Tennessee. In that instance, significant [public pushback](#) led to a request to move the panels out of site so the view of the school was not blocked. As Lilly noted, “We tried to learn from their mistakes and actually surveyed folks around our school. Our neighbors were thrilled with the idea that we would do something progressive.”

According to Safay, the biggest difference in the process between installing the landfill array and installing the school array occurred when he appeared before the Bristol, TN school board for approval. Safay had a negative experience when he approached a school system on the Virginia side of Bristol, so he had a few apprehensions. However, he noted, “I remember going to the school board meeting in Bristol, Tennessee, and everyone was like ‘wow, this is fantastic!’”

Benefits of the Project

Principal Poteat talked about the significance of the array and how it reflects the values of the community: “We built and designed this facility from the ground up to be a learning resource for anyone, whether they’re a student here, a student elsewhere, or an adult in the community at large. We built it without a fence so that it’s accessible 24/7 and 365 days a year.”

The [solar pavilion](#) is large enough to fit the entire school assembly underneath and is used as an outdoor classroom and educational tool, especially for STEM education. Originally the school considered a smaller pavilion—large enough for a single outdoor classroom—and a set of small ground arrays. But after discussing the sort of impact it sought to have, the

team decided to construct and install a single, large solar pavilion. The open-air design creates a practical structure that encourages community use and makes for a more parklike setting.

The pavilion looks out onto a sizable green space adjacent to the main school building. The panels, attached to metal trusses, create a roof that sits atop a concrete slab. Four classrooms—equipped with outdoor-rated dry erase boards, tables, and benches—are defined by the trusses, which take on the appearance of see-through walls. The perimeter of the slab is painted with the educational icons one would expect to find in any elementary grade classroom: the cursive alphabet, number sequences, equations, color wheel, etc. The school is also developing an educational game called Solaropoly, which will be played on the surface of the array. The point is to make learning about solar energy interactive and fun. The array also has Wi-Fi available so that teachers and students can use wireless devices. After school, the area is open and available for picnics and other activities.

A curriculum is being developed for each grade level so that teachers can easily incorporate lessons about solar energy production into the classroom curriculum. Poteat said, “We are doing more hands-on learning, more collaborative learning and more cross-content teaching and activities than we’ve done in the past. I want the kids to be able to sit out there and look at it, do their research and write and create everything from poems, to artwork, to power-point presentations related to it. I want them to be immersed in it, so it will have a lasting impact on them. I want our students to go out to the rest of the world and when they see a school *without* a solar pavilion, they’ll wonder why.”

Lessons Learned

The circumstances in Bristol are familiar to many towns: economic development is a priority, green initiatives are attractive, but resources are limited and solar can be expensive. Before partnering with EES, the city had investigated installing solar but it did not seem to be an option, nor was Bristol necessarily looking for a partner. When it was approached by EES, however, it was open to and ready for the opportunity.

Everything worked out well in Bristol. The city has two successful solar projects that provide guidance on how to make solar work in the future. From Bristol, local governments can gain ideas about the sorts of projects that work for a city. The bigger lesson, however, is the realization that sometimes a public-private partnership is the only way to make projects viable. Bristol knew its limitations and knew it needed the resources of a private company, but it did not actively solicit a partnership. EES took a very active role in working with Bristol to find the locations that would work and create the financial model that made sense to both parties.

Given the ease and benefits of the PPA, cities in states that allow for such partnerships can be more active in soliciting private companies that are interested in designing and developing projects that meet their needs. Private companies have the expertise to help a city develop a solar strategy that takes advantage of its assets and meets its needs.

However, a PPA is not the only possible financing model. Cities may not be aware of the different models available and could benefit from working creatively with private companies. In the case of Bristol, neither the city nor EES was exactly sure at first how to make the project work. But they stayed open-minded and together came up with solutions that met the needs of both partners.

Interviews and Contacts

Dr. Gary Lily, Director of Schools
Bristol, TN City Schools
423-652-9201
LillyG@btcs.org
lillyg@charter.net

Jerry Poteat, Principal
Holston View Elementary
Bristol, TN
423-652-9470
poteatj@btcs.org

Rebecca Rutherford, Teacher
Holston View Elementary
Bristol, TN
423-652-9470

Nick Safay, Vice President of Operations & Development
[EcoLogical Energy Systems](http://EcoLogicalEnergySystems.com)
276-614-0901
nsafay@yourecoenergy.com

Mike Sparks, Former Asst. City Manager and Economic Development
City of Bristol, TN
423-989-5516
mspark@bristoltn.org

Endnotes

1. Population data from U.S. Census Bureau, 2013 estimates; land area data from U.S. Census Bureau, 2010 estimates; budget data from [sources]
2. Bristol, Tennessee, "About the City," <http://www.bristoltn.org/356/About-the-City>.
3. From this point on, unless otherwise noted, Bristol refers to Bristol, Tennessee.
4. Unless otherwise noted, photos were taken by authors and information was obtained through interviews with the individuals listed under "Contacts."

SunShot Solar Outreach Partnership Case Studies are based upon work supported by the U.S. Department of Energy under Award Number DE-EE0003526. The U.S. Department of Energy (DOE) SunShot Initiative is a collaborative national effort to dramatically reduce the cost of solar energy before the end of the decade. The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. DOE program providing outreach, training, and technical assistance to local governments to help them address key barriers to installing solar energy systems in their communities. The International City/County Management Association (ICMA), American Planning Association (APA), and National Association of Regional Councils (NARC), along with ICLEI-Local Governments for Sustainability and its partners, were competitively selected by the U.S. DOE to conduct outreach to local governments across the United States, enabling them to replicate successful solar practices and quickly expand local adoption of solar energy. For more information visit the SolarOPs website (solaroutreach.org) or contact Emily Dodson (edodson@icma.org).

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