TENNESSEE VALLEY AUTHORITY

CONNECTED COMMUNITIES

Johnson City Smart Poles

Pilot Project Case Study

Contents

LOCATION

Johnson City, TN

PROJECT COSTS

$500,000

Total Connected Communities Funding

FOCUS AREAS

Energy and Environmental Justice

Project Summary

The pilot project team retrofitted and supplied new smart poles with LED lighting controls, 4-color LED lights and multiple smart sensors in downtown Founders Park and King Commons Park playground.

TOPICS

- ✓ Community Safety
- ✓ Economic Development
- ✓ Data Collection and Application

TECHNOLOGY

- ✓ Smart Light Poles

KEY PARTNERS

- Local Power Company
- City Officials
- Nonprofit Research Institution
- Project Advisor

TVA TENNESSEE VALLEY AUTHORITY

> Downtown is really the hub of Johnson City, hosting many events, activities and festivals. The data the city has because of the smart lighting structures assists with development decisions for planning these events.

BONNIE DONNOLLY | chief development and market strategy officer, BrightRidge

Challenge and Solution

Challenge

The downtown district of Johnson City is a hub of activity and experiences large amounts of foot and vehicle traffic, making resourcing and safety a top priority. Undergoing restoration and revitalization efforts, the downtown area of Founder's Park hosts major events and festivals, but the area historically suffered from frequent flooding due to its proximity to a creek that runs through downtown. Encouraging prospective business owners and residents to take advantage of the amenities downtown has to offer is critical to the equitable growth of the Johnson City community.

Solution

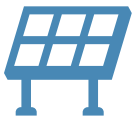
While there are many instances of smart lighting pilot projects across the country, this pilot project focuses on the value and savings of a combination of smart sensor technologies, their applications in different scenarios and how a community can generate positive outcomes by leveraging technology and data. Smart pole technologies offer new opportunities for expanded city services and more data streams while also improving the experience for city or town residents.

In addition to smart lighting, smart poles offer a wide variety of benefits to the town, the local power company and all residents. This pilot project is the first phase in a series to expand smart pole deployment and use in Johnson City, Tennessee. By taking a multiphase approach, the pilot project team will be able to integrate lessons learned into future smart pole installations.

FEATURES OF SMART POLES INCLUDE:

- Environmental sensors, such as flooding sensors
- Insights into energy usage of the poles
- Loudspeakers for music or emergency announcements
- Pedestrian count sensors
- Visual enhancements

Focus Areas Supported



Energy and Environmental Justice

Smart lighting systems can be programmed to adjust brightness based on activity levels and time of day, ensuring that energy is used only when necessary, promoting energy efficiency, reducing light pollution and enhancing public safety. This reduces overall energy consumption and lowers greenhouse gas emissions, contributing to a cleaner environment. Additionally, by providing well-lit areas, these technologies improve safety and accessibility for all community members, particularly in underserved areas that may have previously lacked adequate lighting. By ensuring equitable access to safe and sustainably lit public spaces, smart lighting technology fosters a more inclusive and environmentally conscious urban environment.

Goals, Approach and Results

Project Goals

This pilot project will evaluate the combination of smart lighting and sensor technologies to support business case development for smart poles that enhance energy savings, public safety, park management, community experience and maintenance reduction.

PILOT PROJECT GOAL

Enhance energy savings, public safety, park management, community safety and reduce maintenance needs.

Project Approach

BrightRidge, the local power company serving Johnson City, Tennessee, partnered with their Tennessee Valley Authority (TVA) Customer Relations Manager to identify the Connected Communities funding opportunity and ideate potential ways the funds could be utilized in the Johnson City community. Around the same timeframe, Johnson City officials had been discussing upgrades to Founder's Park, a public space downtown that the city was revitalizing.

This park had a history of flooding, due to a creek running through the area, and the surrounding buildings were in dire need of renovation. The city had a vision of turning the underused space into a location that could host festivals and events in the heart of downtown and proceeded to purchase the area. The updates following the acquisition included flood mitigation measures, a landscaped walking trail, a sculptural art installation and additional lighting fixtures to enhance safety and usability.

As with any environment in which many people gather for events, safety and security are a top priority. The pilot team, including TVA, BrightRidge and Johnson City personnel, collaboratively decided that the addition of smart lighting technology would enable the city to better understand happenings in real-time and ensure future planning efforts intentionally addressed the needs of visitors to the area. After deciding on the vision, a vendor was consulted on technology capabilities and the different features that would provide the most meaningful return on investment for all stakeholders.

Goals, Approach and Results

Project Approach (CONTINUED)

This initial scoping conversation resulted in expanding the project to include upgrades to King Commons playground, another public space that borders Founders Park. By selecting these two underutilized community spaces, Johnson City would be able to collect invaluable data to influence development decisions and revitalization efforts of their downtown area.

After receiving funds and mapping the location of the smart lighting technology fixtures, the project team executed the installation of 49 smart poles through a vendor partner on schedule and on budget. While a few units arrived with faulty mechanisms, the project team was able to coordinate an exchange of the product and received replacements without further delay to the project timeline. As part of the pilot project team, Electric Power Research Institute (EPRI) is compiling and analyzing data to produce key findings that help stakeholders make recommendations for future improvements and next steps.

SENSORS INSTALLED

Founders Park

- LED lighting controls (e.g., synchronized, dimmable and mobile/ cloud-based lighting controls)
- Four-color LED lighting for seasonal decoration or visible warnings
- Audio speakers for broadcasting safety messages and music
- Pedestrian counters to measure park use times and seasonality
- Weather station to measure temperature and barometric pressure
- Water level monitor tied into an audio/ visual alarm for creek level rise

King Commons Playground

- LED lighting controls (e.g., synchronized, dimmable and mobile/ cloud-based lighting controls)
- Four-color LED lighting for seasonal decoration or visible warnings
- Audio speakers for broadcasting safety messages and music

Goals, Approach and Results

Project Results

Flood Mitigation

Founders Park, King Commons and the surrounding area have historically experienced regular flooding, leaving the area swampy and unsuitable for many ideal uses. The smart lighting technology has flood mitigation sensors that notify the city should the water levels rise, enabling a fast emergency response to the threat of flooding in the area.

Compiling data over time, the city can assess long-term flooding trends and make decisions on mitigation strategies and infrastructure should there be a need.

Public Safety

When events and festivals are held in Founders Park and King Commons, smart lighting technology can help guarantee the appropriate police presence and staffing for the number of people in attendance. If attendance spikes, the smart lighting technology can trigger the police department to dispatch additional officers to ensure the safety of festivalgoers and residents alike

Economic Development

Downtown Johnson City is rich with historic architecture and revitalization efforts have been made to ensure prospective business owners have spaces that meet their needs. Smart lighting technology can track foot traffic in an area, providing invaluable customer data for prospective businesses looking to potentially move into a commercial space in this neighborhood.

As Johnson City continues to grow, so will its need for additional infrastructure. To accommodate a bustling downtown area, city officials are currently considering the construction of a multi-level parking garage, which is a very expensive investment. Smart lighting technology is being used to track parking space availability, helping developers make educated decisions about the use of funds and resources.

Goals, Approach and Results

Key Partners

- **BrightRidge**
  - **Bonnie Donnolly**, chief development and market strategy officer
  - **Jeff Dykes**, chief executive officer
  - **Mark Eades**, chief engineering & facilities officer
  - **Mike Stovall**, senior system design engineer
- **EPRI**
  - **Doug Lindsey**, technical lead
  - **Frank Sharp**, principal technical lead
- **Johnson City**
  - **Cathy Ball**, city manager
- **Tennessee Valley Authority**
  - **Lisa Akins**, senior program manager
  - **Georgia Caruthers**, senior project lead

Lessons Learned

1

Trust Stakeholder Expertise

Producing results through innovation takes teamwork and a diverse group of stakeholders to consider implications from all angles. The project team's working relationship allowed them to thoroughly explore potential applications, locations and capabilities of the technology prior to implementation. One of the benefits of smart lighting technology is its flexibility; sensors and data collection mechanisms can be tailored to support the specific needs of the user. With this in mind, the city was heavily involved in the ideation phase to ensure technology aligns with priorities and would meet current and future needs.

> **"The good partnership we have between TVA, BrightRidge and the city has been valuable so many times with other projects, and this was no different. TVA brought in the experts, and we all sat down and we listened to what the city wanted. It really helped the city feel like they were empowered to make good decisions for themselves.**
>
> **BONNIE DONNOLLY** | chief development and market strategy officer, BrightRidge

Looking Ahead

To date, the data from each pole, in most cases, shows consistent efficient power consumption trends based on overnight operation of lights and continuous operation of added loads like speakers, gateways, pedestrian sensors and weather sensors. BrightRidge continues to work with the city to assess options to continuously improve the efficiency of the poles and consider expansion of smart pole technology into other parts of the city.

As more data is collected and analyzed, the city will be empowered to make data-driven decisions regarding new smart lighting installation and other developments with maximum impact and return on investment.

TVA TENNESSEE VALLEY AUTHORITY

CONNECTED COMMUNITIES

Johnson City Smart Poles

Pilot Project Case Study

tva.com/connectedcommunities