



# CLEAN TENNESSEE ENERGY GRANT TENNESSEE STATE PARKS PROJECTS

2012 - 2019

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

OFFICE OF POLICY AND SUSTAINABLE PRACTICES

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# Executive Summary

## Background

In 2011, Tennessee and several other states were awarded financial compensation from a settlement with the Tennessee Valley Authority (TVA) relating to violations of the federal Clean Air Act. A part of the consent decree obligated TVA to provide Tennessee with \$26.4 million to fund energy reduction and air quality improvement projects during a five-year grant process. The Tennessee Department of Environment and Conservation (TDEC) was designated by the Governor as the lead state agency to develop and manage a process for selection and implementation of these projects for Tennessee. TDEC determined that the purpose of the grant would be to provide capital for eligible entities to conduct activities that promoted social, economic, and environmental well-being in the state of Tennessee.

## Cause and Effect

As designed by TDEC, the Clean Tennessee Energy Grant (CTEG) identified and funded projects that result in emissions reductions, utilization of new technology, and support of environmental and economic goals across the state. The CTEG provided financial assistance to State, municipal, and county governments, utility districts, and other entities created by statute (e.g. airport authority, housing authority) in Tennessee to purchase, install, and construct projects that fit into one of the following categories:

- **Clean Alternative Energy:** Examples include biomass, geothermal, solar, wind
- **Energy Conservation:** Examples include lighting, HVAC improvements, improved fuel efficiency, insulation, idling minimization, wastewater treatment technologies
- **Air Quality Improvement:** Reduction of Carbon Dioxide (CO<sub>2</sub>), Sulfur Dioxide (SO<sub>2</sub>), Volatile Organic Compounds (VOCs), Oxides of Nitrogen (NO<sub>x</sub>), Hazardous Air Pollutants (HAPs), and Greenhouse Gases

To allow for equitable dispersion of funds amongst the various qualifying entities, CTEG funds were offered to three specific groups of recipients:

1. External (municipal and county governments, utility districts, housing authorities, etc.),
2. State Government, and
3. Tennessee State Parks.

Each group's projects were selected through a series of annual application processes. Tennessee State Parks (TSP) completed a total of seven rounds of grants that were awarded from FY2013 through FY2019. TSP was selected as a recipient of the funds to reduce their annual utility budget and address their ongoing issue of deferred maintenance. In FY16, TSP's total deferred maintenance costs exceeded an estimated \$110 Million. CTEG funding provided an opportunity to complete these postponed projects and improve aging infrastructure and equipment that otherwise would not have been updated or replaced.

Each fiscal year, specific projects were selected that met the criteria outlined in the settlement and would result in a significant reduction in energy usage and subsequently a decrease in harmful greenhouse gas emissions. Projects were prioritized based upon estimated cost savings and the project's potential return on investment. The rounds were distributed as follows:

- Round 1 (FY2013) – Ranger Residences/Electric Golf Lawn Mowers
- Round 2 (FY2014) – Small Parks/Golf Cart Conversions
- Round 3 (FY2015) – Museums/Interpretive Centers/Electric Golf Lawn Mowers
- Round 4 (FY2016) – Select Park Projects/Electric Golf Lawn Mowers
- Round 5 (FY2017) – Select Park Projects
- Round 6 (FY2018) – Deferred Maintenance Projects
- Round 7 (FY2019) – Deferred Maintenance Projects

## Financial and Environmental Impacts

Since 2012, TDEC has awarded approximately **\$6 million** in CTEG funding to TSP in support of projects promoting alternative energy resources and technologies, energy conservation, and air quality improvement. Since 2012, TSP has avoided an estimated **\$2.7 million**<sup>1</sup> in energy costs as a result of projects awarded through CTEG funds. Savings are estimated based on industry standard anticipated energy reductions for the various projects. Actual savings were difficult to quantify due to insufficient metering at parks to measure specific building energy usage and resulted energy reductions associated with a project.

Energy efficiency projects reduce energy consumption, which in turn reduces the need to generate power. Depending on the generation source, the process of generating power can result in production of harmful air emissions, such as CO<sub>2</sub>. Between fiscal years 2012 and 2018, TSP eliminated large amounts of these harmful air pollutants through innovations in the built environment by integrating renewable energy technology and efficiency measures into both new construction and rehabilitation projects. Since the inception of the grant, these projects have improved the efficiency of energy consumption resulting in the cumulative reduction of energy demands by an estimated **14.3 million kilowatt-hours (kWh)**<sup>2</sup> and reduced CO<sub>2</sub> emissions by almost **16,700 tons of carbon dioxide equivalents (CO<sub>2</sub>e)**<sup>3</sup>. Table 1 in Appendix I provides a list of each state park, their respective projects completed using CTEG funding, and the estimated cost and energy savings, and emissions reductions.

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<sup>1</sup> Based upon cumulative estimated kWh reductions multiplied by [US Energy Information Association](#) utility cost data

<sup>2</sup> Calculated based upon annual utility usage, [eia.gov](#) electricity usage estimates, [energy.gov](#) standards for annual estimated energy savings for specific efficiency projects, multiplied by years since project completion

<sup>3</sup> [EPA Greenhouse Gas Equivalent Calculator](#) converted kWh savings data to CO<sub>2</sub>e

## Deferred Maintenance

Due to limited funding in the past, much of the routine maintenance activities such as repairs on State Park facilities and equipment have been postponed in order to save costs, meet budget funding levels, and pursue other park expenses deemed mission critical. While deferring maintenance can provide a short term budgetary solution, it can result in long term adverse impacts to infrastructure and potential revenue generation for parks.

CTEG funding was utilized to address TSP's ongoing deferred maintenance. Many of the completed energy efficiency projects improved aging infrastructure and equipment that otherwise would not have been updated or replaced. In total, more than \$2.1 million has been allocated since FY13 to reduce the list of outstanding projects and eliminate the high resultant maintenance costs. Table 2 in Appendix I provides the list of each of the deferred maintenance projects that has been completed using CTEG funding.

## Golf Course Electrification Project

In 2013, TSP sought to reduce harmful air emissions and potential hydraulic or petroleum-based product spills and leaks by converting their gas-powered golf course carts and mowers to fully electric equipment.

Phase 1 of the project involved replacing the entire fleet of gas powered mowing equipment with electric powered mowers at Harrison Bay State Park. The next two phases of the project involved assisting parks with the conversion of each of the golf course's gas powered carts to electric. This CTEG funded project has helped TDEC to finalize the transition of its entire fleet of 650 golf carts at its nine courses across the state. Phase 4 of the project involved replacing an additional 22 gas powered mowers with electric at several of the golf courses.

Table 3 in Appendix I provides a list of each phase's projects and the associated costs, emissions reductions, and cost savings.

# APPENDIX I

**TABLE 1**  
**Tennessee State Park Projects**

| PARK NAME         | BUILDING                  | PROJECT TYPE  | COMPLETION DATE | TOTAL PROJECT COST | ESTIMATED ANNUAL SAVINGS |              |                                    | ESTIMATED SIMPLE PAYBACK (years) |
|-------------------|---------------------------|---|-----------------|--------------------|--------------------------|--------------|------------------------------------|----------------------------------|
|                   |                           |   |                 |                    | COST (\$)                | ENERGY (kWh) | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
| Bicentennial Mall | Office                    | Windows   | Dec-17          | \$6,840            | \$5,421                  | 56,918       | 44                                 | 1.3                              |
| Big Cypress Tree  | Restroom                  | Lighting/Sensors, Aerators                                      | Aug-15          | \$450              | \$151                    | 1,586        | 1                                  | 3.0                              |
|                   | Office                    | Programmable Thermostat, Lighting                               | Aug-15          | \$1,717            | \$1,686                  | 17,703       | 14                                 | 1.0                              |
|                   | Maintenance Bldg          | Lighting  | Aug-15          | \$1,146            | \$152                    | 1,596        | 1                                  | 7.5                              |
| Big Hill Pond     | Campground                | Aerators, Lighting  | Oct-16          | \$2,847            | \$1,087                  | 11,414       | 9                                  | 2.6                              |
|                   | All Park                  | Solar Lighting  | Oct-16          | \$865              | \$312                    | 3,276        | 3                                  | 2.8                              |
|                   | Office                    | Lighting, Programmable Thermostat, Water Heater, Doors, Windows | Oct-16          | \$43,588           | \$3,995                  | 41,948       | 33                                 | 10.9                             |
|                   | Maintenance Bldg          | Insulated Garage Doors, Lighting                                | Oct-16          | \$5,661            | \$1,294                  | 13,587       | 11                                 | 4.4                              |
|                   | Picnic Shelter            | Lighting  | Oct-16          | \$1,054            | \$1,184                  | 12,432       | 10                                 | 0.9                              |
| Big Ridge         | Visitor's Center          | Lighting/Sensors  | Sep-17          | \$1,596            | \$844                    | 8,862        | 7                                  | 1.9                              |
|                   | Maintenance Bldg          | Lighting/Sensors  | Sep-17          | \$1,042            | \$1,070                  | 11,235       | 9                                  | 1.0                              |
|                   | Bath Houses 1,3           | Lighting/Sensors  | Sep-17          | \$1,216            | \$389                    | 4,085        | 3                                  | 3.1                              |
|                   | Assembly Hall/Laundry     | Lighting/Sensors  | Sep-17          | \$702              | \$95                     | 998          | 1                                  | 7.4                              |
|                   | Group Camp                | Lighting/Sensors  | Sep-17          | \$828              | \$100                    | 1,050        | 1                                  | 8.3                              |
|                   | All Park                  | Lighting Fixtures/Wiring  | Sep-17          | \$10,000           | \$500                    | 5,250        | 4                                  | 20.0                             |
|                   | Assembly Hall             | Lighting/Sensors  | Sep-17          | \$3,585            | \$244                    | 2,562        | 2                                  | 14.7                             |
|                   | Cabins                    | HVAC  | Jun-18          | \$79,000           | \$5,122                  | 53,781       | 42                                 | 15.4                             |
|                   | Various Buildings         | HVAC  | Jun-18          | \$33,000           | \$2,315                  | 24,308       | 19                                 | 14.3                             |
|                   | Office/Visitor's Center   | Windows   | Jun-18          | \$9,600            | \$359                    | 3,770        | 3                                  | 26.7                             |
|                   | Cabins                    | Lighting  | Jun-18          | \$1,904            | \$1,728                  | 18,144       | 14                                 | 1.1                              |
|                   | Tennis/Basketball Courts  | Lighting  | Jun-18          | \$2,300            | \$283                    | 2,972        | 2                                  | 8.1                              |
| Bledsoe Creek     | Campground Bathhouse Old  | HVAC, Lighting/Sensors  | Nov-15          | \$12,513           | \$1,856                  | 19,488       | 15                                 | 6.7                              |
|                   | Campground Bathhouse New  | HVAC, Lighting/Sensors, Water Heater                            | Nov-15          | \$15,744           | \$3,455                  | 36,278       | 28                                 | 4.6                              |
|                   | Laundry                   | HVAC, Water Heater  | Apr-19          | \$9,000            | \$1,316                  | 15,782       | 12                                 | 6.8                              |
|                   | Maintenance Bldg          | Lighting/Sensors  | Nov-15          | \$13,697           | \$3,358                  | 35,259       | 28                                 | 4.1                              |
| Booker T          | Group Lodge               | Insulation/Heaters  | Apr-17          | \$19,000           | \$1,820                  | 19,110       | 15                                 | 10.4                             |
|                   | Maintenance Bldg          | Water Heater  | Apr-17          | \$1,000            | \$120                    | 1,260        | 1                                  | 8.3                              |
|                   | All Park                  | Lighting  | Feb-19          | \$7,675            | \$3,000                  | 31,500       | 25                                 | 2.6                              |
|                   | Restroom/Maintenance Area | Occupancy Sensors   | Feb-19          | \$700              | \$200                    | 2,100        | 2                                  | 3.5                              |
|                   | Group Lodge Dormitories   | Mini-Split  | Feb-19          | \$24,000           | \$2,436                  | 25,578       | 20                                 | 9.9                              |
| Burgess Falls     | Maintenance Bldg          | Lighting  | May-15          | \$688              | \$404                    | 4,242        | 3                                  | 1.7                              |
|                   | Office                    | Aerators, Lighting, Insulation                                  | May-15          | \$1,921            | \$549                    | 5,765        | 4                                  | 3.5                              |
| Cedars of Lebanon | Cedar Forest Lodge        | Lighting, Windows   | Sep-17          | \$575              | \$240                    | 2,520        | 2                                  | 2.4                              |
|                   | Group Lodge               | Lighting  | Sep-17          | \$1,134            | \$704                    | 7,392        | 6                                  | 1.6                              |
|                   | Assembly Hall             | Lighting  | Oct-17          | \$385              | \$138                    | 1,449        | 1                                  | 2.8                              |
|                   | Office                    | Lighting/Sensors, Windows                                       | Oct-17          | \$25,484           | \$801                    | 8,411        | 7                                  | 31.8                             |
|                   | Maintenance Shop          | Lighting  | Sep-17          | \$504              | \$258                    | 2,709        | 2                                  | 2.0                              |
|                   | Campground Bathhouse      | Lighting/Sensors  | Sep-17          | \$536              | \$69                     | 725          | 1                                  | 7.8                              |
|                   | Cabins                    | HVAC, Water Heater, Windows, Doors                              | Sep-17          | \$75,000           | \$3,587                  | 37,664       | 29                                 | 20.9                             |
| Chickasaw         | Office                    | Lighting, HVAC  | Oct-16          | \$10,968           | \$945                    | 9,923        | 8                                  | 11.6                             |
|                   | Bathhouse 1               | Lighting/Sensors  | Oct-16          | \$480              | \$142                    | 1,491        | 1                                  | 3.4                              |
|                   | Bathhouse 2               | Lighting/Sensors  | Oct-16          | \$480              | \$142                    | 1,491        | 1                                  | 3.4                              |
|                   | Bathhouse 3               | Lighting/Sensors  | Oct-16          | \$544              | \$166                    | 1,743        | 1                                  | 3.3                              |
|                   | Maintenance Bldg          | Lighting/Sensors  | Oct-16          | \$2,460            | \$827                    | 8,684        | 7                                  | 3.0                              |
|                   | Sagamore Lodge            | Lighting  | Oct-16          | \$228              | \$143                    | 1,502        | 1                                  | 1.6                              |
|                   | Group Lodge               | Windows, Water Heater, Lighting                                 | May-19          | \$25,000           | \$1,129                  | 10,172       | 8                                  | 22.1                             |
|                   | Fitness Center            | Lighting  | Oct-16          | \$832              | \$108                    | 1,134        | 1                                  | 7.7                              |
| Cordell Hull      | Office                    | Lighting/Sensors  | Aug-17          | \$1,912            | \$383                    | 4,022        | 3                                  | 5.0                              |
|                   | Museum                    | Lighting/Sensors, HVAC  | Aug-17          | \$1,511            | \$833                    | 8,747        | 7                                  | 1.8                              |
|                   | Maintenance Shop          | Lighting/Sensors  | Aug-17          | \$684              | \$279                    | 2,930        | 2                                  | 2.5                              |
|                   | Maintenance Bldg          | Lighting  | Jun-16          | \$616              | \$279                    | 2,930        | 2                                  | 2.2                              |
|                   | Office                    | Lighting/Sensors, Programmable Thermostat                       | Jul-15          | \$2,988            | \$1,149                  | 12,065       | 9                                  | 2.6                              |
|                   | Rec Hall & Bathrooms      | Lighting/Sensors, HVAC, Programmable Thermostat, Windows, Doors | Jun-16          | \$790              | \$394                    | 4,137        | 3                                  | 2.0                              |
|                   | Campground Check-in       | Lighting/Sensors, Windows, Doors                                | Jul-15          | \$10,684           | \$1,357                  | 14,249       | 11                                 | 7.9                              |

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|---------------------|---------------------------------|--|-----------------|--------------------|--------------------------|--------------|------------------------------------|----------------------------------|
|                     |                                 |  |                 |                    | COST (\$)                | ENERGY (kWh) | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
| Cove Lake           | Bathroom B                      | Lighting, Sink Faucets, Wall Mount Shower Units, Occupancy Sensors, Doors                                    | Jul-15          | \$4,972            | \$2,785                  | 29,243       | 23                                 | 1.8                              |
|                     | Solar Bathroom                  | Occupancy Sensors, Lighting, Wall Mount Shower Units, Sink Faucets   | Jul-15          | \$5,677            | \$2,344                  | 24,612       | 19                                 | 2.4                              |
|                     | Picnic Area                     | Dark Skies Lighting, Water Heater Timers, Occupancy Sensors, Aerators  | Jul-15          | \$11,644           | \$5,241                  | 55,031       | 43                                 | 2.2                              |
|                     | Restrooms between Shelter 5 & 6 | Lighting/Sensors, Windows  | Jul-15          | \$5,844            | \$1,356                  | 14,238       | 11                                 | 4.3                              |
|                     | All Restrooms                   | Lighting/Sensors, Aerators, Doors, Windows, Water Heater Timers  | Jul-15          | \$11,975           | \$4,418                  | 46,389       | 36                                 | 2.7                              |
| Cumberland Mtn      | Bathhouses                      | Lighting   | Oct-16          | \$2,781            | \$881                    | 9,251        | 7                                  | 3.2                              |
|                     | Restaurant                      | Lighting   | Oct-16          | \$5,266            | \$2,876                  | 30,198       | 24                                 | 1.8                              |
|                     | Rec Hall                        | HVAC, Lighting   | Oct-16          | \$52,896           | \$1,487                  | 15,614       | 12                                 | 35.6                             |
|                     | Restaurant                      | HVAC, Hot/Cold Bar, Oven, Fryer  | May-17          | \$61,135           | \$4,374                  | 45,927       | 36                                 | 14.0                             |
|                     | Delux Cabins                    | HVAC   | Jun-18          | \$16,000           | \$1,244                  | 13,062       | 10                                 | 12.9                             |
|                     | Timber Lodges                   | HVAC, Insulation   | Jun-18          | \$11,000           | \$711                    | 7,466        | 6                                  | 15.5                             |
|                     | ProShop                         | HVAC   | Jun-18          | \$27,015           | \$2,211                  | 19,103       | 15                                 | 12.2                             |
| Restaurant          | Insulation, Window Film         | Jun-18   | \$12,085        | \$658              | 6,909                    | 5            | 18.4                               |                                  |
| Cumberland Trail    | Park Office and Lodge           | Lighting/Sensors   | Aug-16          | \$2,150            | \$852                    | 8,946        | 7                                  | 2.5                              |
| David Crockett      | Office                          | Lighting   | Sep-16          | \$1,116            | \$376                    | 3,948        | 3                                  | 3.0                              |
|                     | Museum                          | Lighting, HVAC, Doors  | Sep-16          | \$23,366           | \$3,422                  | 35,931       | 28                                 | 6.8                              |
|                     | Park Ranger's Office            | Lighting, HVAC   | Sep-16          | \$5,996            | \$650                    | 6,825        | 5                                  | 9.2                              |
|                     | Shelter 1                       | Lighting/Sensors   | Sep-16          | \$480              | \$190                    | 1,995        | 2                                  | 2.5                              |
|                     | Murray Circle Restrooms         | Lighting/Sensors   | Sep-16          | \$400              | \$152                    | 1,596        | 1                                  | 2.6                              |
|                     | Maintenance Shed                | Lighting/Sensors   | Sep-16          | \$1,680            | \$534                    | 5,607        | 4                                  | 3.1                              |
|                     | Shelter 7                       | Lighting/Sensors   | Sep-16          | \$240              | \$76                     | 798          | 1                                  | 3.2                              |
|                     | Restaurant (Upstairs)           | Lighting, Fans   | Sep-16          | \$6,405            | \$1,662                  | 17,451       | 14                                 | 3.9                              |
|                     | Restaurant (Downstairs)         | Lighting   | Sep-16          | \$1,820            | \$245                    | 2,573        | 2                                  | 7.4                              |
|                     | Cabins                          | Lighting   | Sep-16          | \$826              | \$500                    | 5,250        | 4                                  | 1.7                              |
|                     | Restaurant                      | Programmable Thermostats   | Oct-17          | \$2,500            | \$299                    | 3,140        | 2                                  | 8.4                              |
|                     | Maintenance Bldg                | Lighting   | Jun-18          | \$720              | \$289                    | 3,035        | 2                                  | 2.5                              |
|                     | Cabins 1-7                      | Water Heaters  | Jun-18          | \$15,000           | \$617                    | 4,263        | 3                                  | 24.3                             |
| Office              | Water Heater                    | Jun-18   | \$3,500         | \$143              | 1,049                    | 1            | 24.5                               |                                  |
| Linen House         | Lighting                        | Jun-18   | \$360           | \$36               | 378                      | 0            | 10.0                               |                                  |
| David Crockett BP   | Museum                          | Lighting, Windows  | Nov-15          | \$15,966           | \$1,674                  | 17,577       | 14                                 | 9.5                              |
|                     | Campground Bathroom             | Lighting, Heaters  | Aug-18          | \$1,040            | \$215                    | 2,258        | 2                                  | 4.8                              |
|                     | Boat Ramp Boathouse             | Lighting, Heaters  | Aug-18          | \$1,040            | \$215                    | 2,258        | 2                                  | 4.8                              |
|                     | Maintenance Shop                | Lighting, Heaters  | Aug-18          | \$2,480            | \$608                    | 6,384        | 5                                  | 4.1                              |
| Dunbar Cave         | Visitor's Center                | Lighting, Parking Lot Lights, HVAC, Duct Work, Water Heater - Point of Use, Windows, Insulation, Hand Dryers | Oct-18          | \$61,617           | \$1,261                  | 13,241       | 10                                 | 48.9                             |
| Edgar Evins         | 3 Buildings                     | Window Film  | Jul-16          | \$18,168           | \$822                    | 8,628        | 7                                  | 22.1                             |
|                     | Office                          | Lighting/Sensors, HVAC   | Nov-17          | \$1,276            | \$384                    | 4,032        | 3                                  | 3.3                              |
|                     | Bathroom near Lake              | Lighting/Sensors   | Nov-17          | \$388              | \$35                     | 368          | 0                                  | 11.1                             |
|                     | Bathrooms in Park               | Lighting/Sensors   | Nov-17          | \$476              | \$127                    | 1,334        | 1                                  | 3.7                              |
|                     | Maintenance Shop                | Lighting/Sensors   | Nov-17          | \$3,770            | \$1,234                  | 12,957       | 10                                 | 3.1                              |
|                     | Camp Store                      | Lighting/Sensors   | Nov-17          | \$798              | \$278                    | 2,919        | 2                                  | 2.9                              |
|                     | Campground Bathroom 1           | Lighting/Sensors   | Nov-17          | \$468              | \$100                    | 1,050        | 1                                  | 4.7                              |
|                     | Campground Bathroom 2           | Lighting/Sensors   | Nov-17          | \$508              | \$108                    | 1,134        | 1                                  | 4.7                              |
|                     | Campground Bathroom 3           | Lighting/Sensors   | Nov-17          | \$508              | \$108                    | 1,134        | 1                                  | 4.7                              |
|                     | Beach Bathroom                  | Lighting/Sensors   | Nov-17          | \$470              | \$136                    | 1,428        | 1                                  | 3.5                              |
|                     | Boat Ramp Boathouse             | Lighting/Sensors   | Nov-17          | \$470              | \$136                    | 1,428        | 1                                  | 3.5                              |
|                     | Interpretive Center             | Lighting/Sensors   | Nov-17          | \$752              | \$440                    | 4,620        | 4                                  | 1.7                              |
|                     | Cabins (28)                     | Lighting/Sensors, HVAC   | Aug-17          | \$69,144           | \$8,937                  | 93,839       | 73                                 | 7.7                              |
|                     | Cabins (4)                      | Lighting/Sensors   | Nov-17          | \$960              | \$524                    | 5,502        | 4                                  | 1.8                              |
| Handicap Cabins (2) | Lighting/Sensors, HVAC          | Nov-17   | \$586           | \$212              | 2,226                    | 2            | 2.8                                |                                  |
|                     | Museum                          | Lighting, Roof, Windows, Doors   | Oct-15          | \$89,414           | \$6,587                  | 69,164       | 54                                 | 13.6                             |
|                     | Lakeside Cabins                 | Geothermal   | May-14          | \$400,000          | \$28,000                 | 294,000      | 229                                | 14.3                             |

**TABLE 1**  
**Tennessee State Park Projects**

| PARK NAME        | BUILDING                   | PROJECT TYPE   | COMPLETION DATE | TOTAL PROJECT COST | ESTIMATED ANNUAL SAVINGS |              |                                    | ESTIMATED SIMPLE PAYBACK (years) |
|------------------|----------------------------|--|-----------------|--------------------|--------------------------|--------------|------------------------------------|----------------------------------|
|                  |                            |  |                 |                    | COST (\$)                | ENERGY (kWh) | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
| Fall Creek Falls | Lodge 1 and 2              | Water Heater Replacement, Windows, Doors   | Jun-18          | \$80,000           | \$3,866                  | 40,593       | 32                                 | 20.7                             |
|                  | Nature Center              | Water Heater Replacement, Windows, Doors   | Jun-18          | \$4,500            | \$203                    | 2,132        | 2                                  | 22.2                             |
|                  | Bathhouses                 | Water Heater Replacement, Windows, Doors   | Jun-18          | \$57,000           | \$2,698                  | 28,329       | 22                                 | 21.1                             |
| Fort Loudoun     | Museum                     | Doors, Lighting, Water Heater, Window Film   | Oct-15          | \$18,961           | \$1,487                  | 15,614       | 12                                 | 12.8                             |
|                  | Maintenance Shop           | Lighting, Wood Stove, Heater   | Sep-17          | \$2,966            | \$303                    | 3,182        | 2                                  | 9.8                              |
|                  | Picnic Area Bathrooms      | Lighting   | Sep-17          | \$160              | \$16                     | 168          | 0                                  | 10.0                             |
|                  | Bathhouse                  | Lighting   | Sep-17          | \$1,500            | \$284                    | 1,881        | 1                                  | 5.3                              |
|                  | Parking Lot                | Lighting   | Sep-17          | \$1,600            | \$402                    | 4,221        | 3                                  | 4.0                              |
| Ft Pillow        | Visitor's Center           | Lighting, Window Film  | Sep-16          | \$5,151            | \$1,435                  | 15,068       | 12                                 | 3.6                              |
|                  | Museum                     | Water Heater   | Aug-18          | \$1,400            | \$842                    | 8,841        | 7                                  | 1.7                              |
|                  | Maintenance Shop           | Water Heater   | Aug-18          | \$1,400            | \$237                    | 2,489        | 2                                  | 5.9                              |
| Frozen Head      | Visitor's Center           | Lighting/Sensors, Water Heater   | Mar-16          | \$26,306           | \$622                    | 6,531        | 5                                  | 42.3                             |
|                  | Campground Bathhouse       | Aerators, Water Heater   | Mar-16          | \$2,488            | \$1,256                  | 13,188       | 10                                 | 2.0                              |
|                  | Shelter A Bathhouse        | Aerators, Water Heater, Dark Skies Lighting  | Mar-16          | \$7,422            | \$185                    | 1,943        | 2                                  | 40.1                             |
| Harpeth River    | Park Office                | Insulation/Lighting Covers, Window Film, Doors                                     | Jul-18          | \$10,450           | \$1,593                  | 14,907       | 12                                 | 6.6                              |
| Harrison Bay     | Interpretive Center        | HVAC   | Mar-19          | \$15,000           | \$900                    | 7,125        | 6                                  | 16.7                             |
|                  | ProShop                    | HVAC   | Mar-19          | \$25,835           | \$1,390                  | 11,141       | 9                                  | 18.6                             |
|                  | Camp Store                 | HVAC, insulation, windows  | Mar-19          | \$15,000           | \$667                    | 5,727        | 4                                  | 22.5                             |
| Henry Horton     | Conference Lodge           | Lighting   | Sep-16          | \$4,192            | \$445                    | 4,673        | 4                                  | 9.4                              |
|                  | Camp Store                 | Lighting   | Dec-18          | \$1,144            | \$339                    | 3,560        | 3                                  | 3.4                              |
|                  | Campground Bathhouse       | Lighting   | Dec-18          | \$853              | \$146                    | 1,533        | 1                                  | 5.8                              |
|                  | RV Bathhouse               | Lighting   | Dec-18          | \$853              | \$146                    | 1,533        | 1                                  | 5.8                              |
|                  | Maintenance Shop           | Lighting, Wood Stove   | Dec-18          | \$3,380            | \$1,483                  | 15,572       | 12                                 | 2.3                              |
| Hiwassee/Ocoee   | Visitor's Center           | Lighting/Sensors   | Jun-15          | \$5,112            | \$1,485                  | 15,593       | 12                                 | 3.4                              |
|                  | Sugarloaf Restroom         | Lighting/Sensors, Insulation, Windows, Doors                                       | Jun-15          | \$7,987            | \$709                    | 7,445        | 6                                  | 11.3                             |
|                  | Maintenance Shop           | Lighting, Heaters  | Jun-18          | \$2,080            | \$331                    | 3,476        | 3                                  | 6.3                              |
| Indian Mtn       | Office/Visitor's Center    | Programmable Thermostats, Water Heater, Aerators, Lighting/Sensors, Windows, Doors | May-15          | \$17,944           | \$783                    | 8,222        | 6                                  | 22.9                             |
|                  | Campground Bathhouse       | Aerators, Water Heater, Lighting, Insulation                                       | May-15          | \$5,133            | \$187                    | 1,964        | 2                                  | 27.4                             |
|                  | Maintenance Shop           | Insulation, Lighting   | May-15          | \$5,821            | \$1,308                  | 13,734       | 11                                 | 4.5                              |
|                  | New Bathhouse (Campground) | Solar - Roof   | Nov-18          | \$26,700           | \$1,100                  | 11,550       | 9                                  | 24.3                             |
| Long Hunter      | Visitor's Center           | Window Film, Programmable Thermostat, Weather Stripping, HVAC, Lighting/Sensors    | Oct-15          | \$18,214           | \$2,241                  | 23,531       | 18                                 | 8.1                              |
|                  | Couchville Bathhouse       | Lighting/Sensors, Aerators   | Oct-15          | \$812              | \$251                    | 2,636        | 2                                  | 3.2                              |
|                  | Maintenance Shop           | Water Heater, Lighting   | Oct-15          | \$4,211            | \$293                    | 3,077        | 2                                  | 14.4                             |
| Meeman-Shelby    | Visitor's Center           | Lighting, HVAC   | Apr-18          | \$15,000           | \$1,569                  | 16,475       | 13                                 | 9.6                              |
|                  | Group Camp                 | Lighting, HVAC   | Apr-18          | \$15,790           | \$757                    | 7,949        | 6                                  | 20.9                             |
|                  | Nature Center              | Lighting/Sensors, HVAC, windows  | Apr-18          | \$30,768           | \$1,751                  | 17,160       | 13                                 | 17.6                             |
|                  | Maintenance Bldg           | Lighting/Sensors   | Apr-18          | \$10,000           | \$403                    | 3,786        | 3                                  | 24.8                             |
|                  | RV CG Bathhouse 2          | Lighting   | Apr-18          | \$820              | \$209                    | 2,195        | 2                                  | 3.9                              |
|                  | Disc Golf Shelter          | Lighting/Sensors   | Apr-18          | \$810              | \$113                    | 1,187        | 1                                  | 7.2                              |
|                  | Shelter 3                  | Lighting/Sensors   | Apr-18          | \$810              | \$113                    | 1,187        | 1                                  | 7.2                              |
|                  | Shelter 6                  | Lighting/Sensors   | Apr-18          | \$768              | \$93                     | 977          | 1                                  | 8.3                              |
|                  | Office                     | Lighting/Sensors, Water Heater Replacement   | Jun-18          | \$3,612            | \$904                    | 9,492        | 7                                  | 4.0                              |
|                  | Warehouse                  | Lighting/Sensors, Windows, Doors   | Jun-18          | \$5,160            | \$385                    | 4,043        | 3                                  | 13.4                             |
|                  | Maintenance Shop           | Lighting/Sensors, Windows, Doors   | Jun-18          | \$13,904           | \$2,509                  | 25,625       | 20                                 | 5.5                              |

**TABLE 1**  
**Tennessee State Park Projects**

| PARK NAME                   | BUILDING                 | PROJECT TYPE   | COMPLETION DATE | TOTAL PROJECT COST | ESTIMATED ANNUAL SAVINGS |              |                                    | ESTIMATED SIMPLE PAYBACK (years) |
|-----------------------------|--------------------------|--|-----------------|--------------------|--------------------------|--------------|------------------------------------|----------------------------------|
|                             |                          |  |                 |                    | COST (\$)                | ENERGY (kWh) | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
| Montgomery Bell             | Campground               | Water Heater Replacement, Windows, Doors   | Jun-18          | \$6,000            | \$234                    | 2,457        | 2                                  | 25.6                             |
|                             | Ranger Station           | Water Heater Replacement   | Jun-18          | \$2,000            | \$166                    | 1,743        | 1                                  | 12.0                             |
|                             | Group Camp 1             | Water Heater Replacement   | Jun-18          | \$1,000            | \$92                     | 966          | 1                                  | 10.9                             |
|                             | Swimming Pool            | Windows, Doors   | Jun-18          | \$10,000           | \$335                    | 3,518        | 3                                  | 29.9                             |
|                             | Visitor's Center         | Windows, Doors   | Jun-18          | \$20,000           | \$779                    | 8,180        | 6                                  | 25.7                             |
| Mousetail Landing           | Campground Bathhouse     | Lighting, Washer   | Feb-16          | \$1,863            | \$1,414                  | 14,847       | 12                                 | 1.3                              |
|                             | Visitor's Center         | Insulation/Vapor Barrier, Lighting, HVAC, Water Heater   | Feb-16          | \$7,912            | \$1,535                  | 12,896       | 10                                 | 5.2                              |
|                             | Maintenance Shop         | Lighting, HVAC, Water Heater Replacement, Windows, Doors   | Feb-16          | \$9,844            | \$1,670                  | 17,535       | 14                                 | 5.9                              |
|                             | Campground Bathhouse     | Occupancy Sensors, Lighting  | Feb-16          | \$865              | \$169                    | 1,775        | 1                                  | 5.1                              |
| Natchez Trace               | Group Lodge              | Lighting   | Jul-17          | \$2,919            | \$322                    | 3,381        | 3                                  | 9.1                              |
|                             | Recreation Lodge         | Lighting   | Jul-17          | \$452              | \$221                    | 2,321        | 2                                  | 2.0                              |
|                             | Office                   | Lighting, HVAC, Windows, Doors   | Apr-18          | \$82,120           | \$4,150                  | 43,575       | 34                                 | 19.8                             |
|                             | Wrgrl Small Bathhouse    | Lighting/Sensors   | Apr-18          | \$243              | \$59                     | 620          | 0                                  | 4.1                              |
|                             | Wrnglr Large Bathhouse   | Lighting/Sensors, Water Heater Replacement   | Apr-18          | \$1,749            | \$776                    | 8,148        | 6                                  | 2.3                              |
|                             | Maintenance Bldg         | Lighting/Sensors   | Apr-18          | \$1,990            | \$1,787                  | 18,764       | 15                                 | 1.1                              |
|                             | General Store            | Lighting   | Apr-18          | \$990              | \$123                    | 1,292        | 1                                  | 8.0                              |
|                             | CG 1 Bathhouse           | Lighting/Sensors   | Apr-18          | \$532              | \$118                    | 1,239        | 1                                  | 4.5                              |
|                             | Pin Oak Lodge            | HVAC, Lighting (Indoor), Lighting (Outdoor), Water Heater Replacement (Inn and Restaurant), Windows, Doors | Jun-18          | \$282,655          | \$17,441                 | 183,131      | 143                                | 16.2                             |
|                             | Cub Lake Cabins          | HVAC, Lighting   | Jun-18          | \$98,400           | \$8,781                  | 92,201       | 72                                 | 11.2                             |
|                             | Group Camp               | HVAC, Lighting   | Jun-18          | \$35,000           | \$2,668                  | 28,014       | 22                                 | 13.1                             |
|                             | Group Camp Bunkhouse     | Lighting, Water Heater Replacement   | Jun-18          | \$30,500           | \$2,644                  | 27,762       | 22                                 | 11.5                             |
|                             | Visitor Center           | Water Heater   | Jun-18          | \$3,500            | \$432                    | 4,222        | 3                                  | 8.1                              |
|                             | RV Campground            | Lighting, Water Heater Replacement   | Jun-18          | \$31,640           | \$2,763                  | 34,292       | 27                                 | 11.5                             |
| Nathan Bedford Forrest      | Museum                   | Lighting, HVAC, Window Film, Doors, Water Heater   | Jul-17          | \$45,394           | \$4,688                  | 49,224       | 38                                 | 9.7                              |
|                             | Group Lodge              | HVAC, Lighting, Windows, Boiler  | Jul-18          | \$135,915          | \$13,377                 | 140,459      | 110                                | 10.2                             |
|                             | Cabins                   | HVAC, Water Heaters  | Jul-17          | \$36,460           | \$2,916                  | 32,025       | 25                                 | 12.5                             |
|                             | Office                   | Window Film  | Jul-17          | \$3,520            | \$358                    | 3,759        | 3                                  | 9.8                              |
| Maintenance Shop            | Lighting, Heaters        | Jul-17   | \$1,200         | \$290              | 3,045                    | 2            | 4.1                                |                                  |
| Norris Dam                  | Tea Room                 | Lighting/Sensors, HVAC, Water Heater   | Jul-16          | \$24,917           | \$1,730                  | 18,165       | 14                                 | 14.4                             |
|                             | Maintenance Building     | Lighting/Sensors   | Jul-16          | \$2,144            | \$1,090                  | 11,445       | 9                                  | 2.0                              |
|                             | Visitor's Center         | HVAC, Windows, Doors   | Jun-18          | \$60,000           | \$2,483                  | 26,072       | 20                                 | 24.2                             |
|                             | Museum                   | Lighting, Water Heater, Windows, Window Film, Doors  | Nov-15          | \$69,249           | \$6,189                  | 64,985       | 51                                 | 11.2                             |
|                             | AAA Cabins               | HVAC   | Jun-18          | \$35,000           | \$2,396                  | 25,158       | 20                                 | 14.6                             |
|                             | Wedding Cottage          | HVAC, Insulation   | Jun-18          | \$14,000           | \$1,134                  | 11,907       | 9                                  | 12.3                             |
|                             | Village Green Linen Room | Insulation, Windows, Doors   | Jun-18          | \$40,000           | \$1,593                  | 16,727       | 13                                 | 25.1                             |
|                             | Maintenance Shop         | Wood Stove, Heater   | May-18          | \$1,700            | \$106                    | 1,113        | 1                                  | 16.0                             |
|                             | Recreation Room          | Lighting, Heaters  | May-18          | \$3,139            | \$765                    | 8,033        | 6                                  | 4.1                              |
|                             | Village Green            | Outdoor Lighting   | May-18          | \$20,000           | \$3,629                  | 32,562       | 25                                 | 5.5                              |
|                             | CG Bathhouses            | Exterior Lighting  | May-18          | \$8,000            | \$509                    |              |                                    | 15.7                             |
| Appalachian Conference Room | Lighting                 | May-18   | \$140           | \$71               | 746                      | 1            | 2.0                                |                                  |
| Old Stone Fort              | Museum                   | Lighting, Windows, Doors   | Jul-15          | \$18,579           | \$1,548                  | 16,254       | 13                                 | 12.0                             |
|                             | Maintenance Bldg         | Lighting   | May-18          | \$5,115            | \$511                    | 5,366        | 4                                  | 10.0                             |
| Panther Creek               | Visitor's Center         | Lighting/Sensors   | Sep-16          | \$1,108            | \$362                    | 3,801        | 3                                  | 3.1                              |
|                             | Maintenance Bldg         | Lighting, Windows, Doors, HVAC, Insulation   | Sep-16          | \$931              | \$438                    | 4,599        | 4                                  | 2.1                              |
|                             | Auxiliary Bldg           | HVAC, Water Heater, Windows, Doors   | Jun-18          | \$14,500           | \$654                    | 6,867        | 5                                  | 22.2                             |
|                             | Ranger Station           | Water Heater Replacement   | Jun-18          | \$800              | \$61                     | 641          | 0                                  | 13.1                             |

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**Tennessee State Park Projects**

| PARK NAME        | BUILDING                    | PROJECT TYPE  | COMPLETION DATE | TOTAL PROJECT COST | ESTIMATED ANNUAL SAVINGS |              |                                    | ESTIMATED SIMPLE PAYBACK (years) |
|------------------|-----------------------------|---|-----------------|--------------------|--------------------------|--------------|------------------------------------|----------------------------------|
|                  |                             |   |                 |                    | COST (\$)                | ENERGY (kWh) | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
|                  | Pool Building Bathhouse     | Water Heater Replacement  | Jun-18          | \$2,700            | \$224                    | 2,352        | 2                                  | 12.1                             |
| Paris Landing    | Office                      | Lighting, HVAC, Window Film   | Jun-18          | \$24,864           | \$2,015                  | 21,158       | 17                                 | 12.3                             |
|                  | Marina                      | Lighting  | Nov-16          | \$850              | \$444                    | 4,662        | 4                                  | 1.9                              |
|                  | Golf Proshop                | HVAC, Windows, Water Heater   | Jun-18          | \$60,000           | \$5,313                  | 50,384       | 39                                 | 11.3                             |
|                  | Maintenance Bldg            | Lighting/Sensors  | Nov-16          | \$2,000            | \$642                    | 6,741        | 5                                  | 3.1                              |
|                  | Small Shelter               | Lighting, Heater  | Nov-16          | \$2,860            | \$1,195                  | 12,548       | 10                                 | 2.4                              |
|                  | Conference Center           | Lighting  | Nov-16          | \$13,345           | \$3,456                  | 36,288       | 28                                 | 3.9                              |
|                  | Cabins                      | Lighting, Water Heater Replacement  | Jun-18          | \$53,588           | \$4,501                  | 47,261       | 37                                 | 11.9                             |
|                  | Marina Parking Lot Lighting | Lighting  | Dec-18          | \$27,000           | \$14,354                 | 150,717      | 118                                | 1.9                              |
|                  | Upper and Lower Bathhouses  | Lighting, Sensors, Water Heaters  | Jun-18          | \$17,720           | \$1,903                  | 19,982       | 16                                 | 9.3                              |
|                  | Cabins (10)                 | Water Heater  | Jun-18          | \$14,500           | \$2,100                  | 22,050       | 17                                 | 6.9                              |
| Pickett          | Group Camp                  | Lighting, HVAC, Windows   | Dec-16          | \$88,148           | \$4,422                  | 45,745       | 36                                 | 19.9                             |
|                  | Visitor's Center            | Lighting/Sensors, HVAC  | Nov-16          | \$1,798            | \$487                    | 5,114        | 4                                  | 3.7                              |
|                  | Residence/Museum            | Lighting/Sensors  | Nov-16          | \$437              | \$180                    | 1,890        | 1                                  | 2.4                              |
|                  | Ranger Station              | HVAC, Insulation, Windows, Doors, Lighting  | Jun-18          | \$27,200           | \$2,699                  | 28,340       | 22                                 | 10.1                             |
|                  | GC Bathhouses               | HVAC/Mini-Split   | Jun-18          | \$10,000           | \$546                    | 4,775        | 4                                  | 18.3                             |
|                  | Nature Center               | HVAC, Windows, Window Film  | Nov-16          | \$9,000            | \$477                    | 4,288        | 3                                  | 18.9                             |
|                  | Cabins 1-10                 | Lighting  | Nov-16          | \$10,000           | \$1,820                  | 18,714       | 15                                 | 5.5                              |
|                  | Cabins 6-10                 | HVAC, Windows, Doors, Lighting  | Jun-18          | \$87,000           | \$4,688                  | 49,224       | 38                                 | 18.6                             |
| Pickwick Landing | Office                      | Lighting, HVAC, Window Film, Water Heater   | May-17          | \$13,955           | \$1,164                  | 12,222       | 10                                 | 12.0                             |
|                  | PG Loop Restroom            | Lighting/Sensors, Mini-Split  | May-17          | \$3,240            | \$425                    | 4,463        | 3                                  | 7.6                              |
|                  | State Park Road Bathhouse   | Lighting, Mini-Split  | May-17          | \$3,400            | \$759                    | 7,970        | 6                                  | 4.5                              |
|                  | Maintenance Bldg            | Lighting/Sensors, Wood Burning Stove, Mini-Split  | May-17          | \$5,900            | \$1,270                  | 13,335       | 10                                 | 4.6                              |
|                  | Check-in Station            | Lighting, Mini-Split  | May-17          | \$3,085            | \$367                    | 3,854        | 3                                  | 8.4                              |
| Pinson Mounds    | Group Lodge and Cabins      | Lighting  | Oct-16          | \$2,585            | \$264                    | 2,772        | 2                                  | 9.8                              |
|                  | Museum                      | Lighting, Doors   | Jul-18          | \$65,753           | \$3,824                  | 40,152       | 31                                 | 17.2                             |
|                  | Maintenance Bldg            | Lighting  | Jan-18          | \$2,685            | \$388                    | 4,074        | 3                                  | 6.9                              |
|                  | Bunkhouse                   | HVAC  | Mar-19          | \$16,000           | \$960                    | 10,080       | 8                                  | 16.7                             |
|                  | Assembly Bldg               | Lighting, Windows, Doors  | Jan-18          | \$4,210            | \$548                    | 5,754        | 4                                  | 7.7                              |
|                  | Pavilions                   | Lighting  | Jan-18          | \$2,282            | \$220                    | 2,310        | 2                                  | 10.4                             |
| Port Royal       | Visitor's Center            | Lighting/Sensors, Spray Foam, Hot Water Heater (Hybrid), HVAC 2 Split Units, Windows, Doors, Parking Lot Lights | Dec-18          | \$42,229           | \$1,121                  | 11,771       | 9                                  | 37.7                             |
|                  | Bathrooms                   | Inside Lighting, Outside Lighting, Hand Dryers, Rolled Insulation, New Heaters                                  | Dec-18          | \$4,836            | \$660                    | 6,930        | 5                                  | 7.3                              |
|                  | Maintenance Shop            | Lighting  | Aug-17          | \$280              | \$218                    | 2,289        | 2                                  | 1.3                              |
| Radnor Lake      | Visitor's Center            | Lighting, Insulation, Windows   | Feb-15          | \$32,383           | \$1,855                  | 19,478       | 15                                 | 17.5                             |
|                  | Maintenance Shop            | Insulation, Wood Stove, Lighting  | Feb-15          | \$6,596            | \$511                    | 5,366        | 4                                  | 12.9                             |
|                  | Ranger Residence 1          | Insulation  | Mar-15          | \$8,625            | \$677                    | 7,109        | 6                                  | 12.7                             |
|                  | Ranger Residence 2          | Insulation  | Jun-15          | \$9,423            | \$712                    | 7,476        | 6                                  | 13.2                             |
|                  | Ranger Residence 3          | Insulation  | Mar-15          | \$4,139            | \$355                    | 3,728        | 3                                  | 11.7                             |
|                  | Education Center            | Insulation, Wood Stoves, Lighting   | Oct-17          | \$22,152           | \$2,041                  | 21,431       | 17                                 | 10.9                             |
|                  | East Parking Lot Bathhouse  | Doors, Lighting   | Jul-17          | \$15,048           | \$488                    | 5,124        | 4                                  | 30.8                             |
|                  | Parkwide Lawncare           | Electric Mower (2)  | Mar-18          | \$49,996           | \$0                      | 0            | 0                                  | 0.0                              |
|                  | Barn and Garage             | Lighting  | Jan-18          | \$6,318            | \$358                    | 3,759        | 3                                  | 17.6                             |
| Red Clay         | Museum                      | Lighting, Insulation, Water Heater, Doors   | Oct-15          | \$38,845           | \$3,581                  | 37,601       | 29                                 | 10.8                             |
|                  | Visitor's Center            | Programmable Thermostats  | Aug-17          | \$1,000            | \$157                    | 1,649        | 1                                  | 6.4                              |
|                  | Maintenance Shop            | Lighting, Heaters   | Aug-17          | \$2,238            | \$597                    | 6,269        | 5                                  | 3.7                              |
| Reelfoot Lake    | Office                      | Lighting, HVAC, Windows, Doors  | Sep-17          | \$17,730           | \$1,846                  | 19,383       | 15                                 | 9.6                              |
|                  | Visitor's Center            | Lighting/Sensors, HVAC, Doors   | Sep-17          | \$25,140           | \$2,402                  | 25,221       | 20                                 | 10.5                             |

**TABLE 1**  
**Tennessee State Park Projects**

| PARK NAME          | BUILDING                   | PROJECT TYPE  | COMPLETION DATE | TOTAL PROJECT COST | ESTIMATED ANNUAL SAVINGS |                  |                                    | ESTIMATED SIMPLE PAYBACK (years) |
|--------------------|----------------------------|---|-----------------|--------------------|--------------------------|------------------|------------------------------------|----------------------------------|
|                    |                            |   |                 |                    | COST (\$)                | ENERGY (kwh)     | EMISSIONS (TONS CO <sub>2</sub> e) |                                  |
| Meemout Lake       | Lake St. Bathhouse         | Lighting/Sensors  | Sep-17          | \$1,621            | \$721                    | 7,571            | 6                                  | 2.2                              |
|                    | Maintenance Bldg           | Lighting/Sensors  | Sep-17          | \$2,593            | \$601                    | 6,311            | 5                                  | 4.3                              |
|                    | Parkwide                   | Lighting  | Sep-17          | \$7,000            | \$1,123                  | 2,948            | 2                                  | 6.2                              |
|                    | Ellington Hall             | Windows   | Dec-18          | \$29,790           | \$1,088                  | 11,424           | 9                                  | 27.4                             |
| Roan Mtn           | Maintenance Bldg           | Lighting/Sensors  | Aug-16          | \$2,412            | \$964                    | 10,122           | 8                                  | 2.5                              |
|                    | Convention Center          | Lighting  | Aug-16          | \$1,148            | \$191                    | 2,006            | 2                                  | 6.0                              |
|                    | CG Bathhouses              | Lighting/Sensors  | Aug-16          | \$1,042            | \$252                    | 2,646            | 2                                  | 4.1                              |
|                    | Museum                     | Lighting, Water Heater, Insulation, HVAC, Doors         | Nov-15          | \$52,921           | \$5,421                  | 56,921           | 44                                 | 9.8                              |
|                    | Cabins 1-20                | Insulation, water heaters                               | Oct-18          | \$80,000           | \$5,309                  | 50,112           | 39                                 | 15.1                             |
|                    | Picnic Shelter 1           | Lighting  | Oct-18          | \$10,000           | \$704                    | 6,334            | 5                                  | 14.2                             |
|                    | Campground Bathhouse       | Lighting  | Oct-18          | \$4,520            | \$626                    | 6,573            | 5                                  | 7.2                              |
|                    | Tennis/Basketball Courts   | Lighting  | Oct-18          | \$4,600            | \$470                    | 4,935            | 4                                  | 9.8                              |
| Rock Island        | Office                     | Lighting/Sensors  | Oct-17          | \$1,685            | \$1,280                  | 13,440           | 10                                 | 1.3                              |
|                    | Bathhouse near River       | Lighting/Sensors  | Oct-17          | \$440              | \$367                    | 3,854            | 3                                  | 1.2                              |
|                    | Maintenance Shop           | Lighting  | Oct-17          | \$2,641            | \$943                    | 9,902            | 8                                  | 2.8                              |
|                    | Campground Bathhouse 1     | Lighting/Sensors  | Oct-17          | \$551              | \$99                     | 1,040            | 1                                  | 5.6                              |
|                    | Campground Bathhouse 2     | Lighting/Sensors  | Oct-17          | \$530              | \$70                     | 735              | 1                                  | 7.6                              |
|                    | Cabins (10)                | Lighting  | Oct-17          | \$2,800            | \$2,202                  | 23,121           | 18                                 | 1.3                              |
|                    | Nature Center              | Lighting/Sensors  | Oct-17          | \$436              | \$119                    | 1,250            | 1                                  | 3.7                              |
|                    | Visitor's Center           | HVAC  | Oct-17          | \$12,000           | \$1,336                  | 14,028           | 11                                 | 9.0                              |
|                    | Cabins                     | Lighting, HVAC, Water Heaters                           | May-18          | \$64,244           | \$7,251                  | 76,136           | 59                                 | 8.9                              |
| Linen House        | Lighting                   | May-18  | \$508           | \$188              | 1,974                    | 2                | 2.7                                |                                  |
| Sgt. Alvin C. York | Historic Home              | HVAC Replacement, Mini-Split                            | Sep-18          | \$9,414            | \$1,000                  | 10,500           | 8                                  | 9.4                              |
|                    | Visitor's Center           | Front Doors   | Dec-18          | \$3,490            | \$440                    | 4,620            | 4                                  | 7.9                              |
| Sth. Cumberland    | Museum                     | HVAC, Lighting, Doors, Water Heater                     | Nov-15          | \$27,763           | \$2,431                  | 25,526           | 20                                 | 11.4                             |
|                    | Visitor's Center Restrooms | Lighting/Sensors  | Nov-16          | \$480              | \$243                    | 2,552            | 2                                  | 2.0                              |
|                    | Maintenance Shed           | Lighting/Sensors  | Nov-16          | \$2,240            | \$1,243                  | 13,052           | 10                                 | 1.8                              |
|                    | Grundy Lakes Bathhouse     | Lighting/Sensors  | Nov-16          | \$643              | \$245                    | 2,573            | 2                                  | 2.6                              |
|                    | Foster Falls Bathhouse     | Lighting/Sensors  | Nov-16          | \$309              | \$547                    | 5,744            | 4                                  | 0.6                              |
|                    | Grundy Forest Bathhouse    | Lighting/Sensors  | Nov-16          | \$520              | \$211                    | 2,216            | 2                                  | 2.5                              |
|                    | Stone Door Bathhouse       | Lighting/Sensors  | Nov-16          | \$320              | \$570                    | 5,985            | 5                                  | 0.6                              |
| Standing Stone     | Maintenance Bldg           | Lighting/Sensors  | Sep-16          | \$1,806            | \$942                    | 9,891            | 8                                  | 1.9                              |
|                    | Tea Room                   | Lighting/Sensors, HVAC                                  | Mar-18          | \$15,452           | \$1,094                  | 10,741           | 8                                  | 14.1                             |
|                    | Visitor's Center           | Lighting/Sensors  | Sep-16          | \$2,314            | \$606                    | 6,363            | 5                                  | 3.8                              |
|                    | Cabins (14)                | Lighting, HVAC  | Sep-16          | \$70,145           | \$1,584                  | 16,632           | 13                                 | 44.3                             |
|                    | Pool Area (3 Buildings)    | Lighting  | Sep-16          | \$662              | \$75                     | 788              | 1                                  | 8.8                              |
|                    | Recreation Hall            | Lighting  | Sep-16          | \$790              | \$108                    | 1,134            | 1                                  | 7.3                              |
|                    | Rock Bathhouse             | Lighting/Sensors  | Sep-16          | \$601              | \$149                    | 1,565            | 1                                  | 4.0                              |
|                    | Brick Bathhouse            | Lighting/Sensors  | Sep-16          | \$508              | \$134                    | 1,407            | 1                                  | 3.8                              |
|                    | Overton Lodge              | Lighting, Windows, Doors                                | Sep-16          | \$482              | \$103                    | 1,082            | 1                                  | 4.7                              |
|                    | Office                     | HVAC, Lighting, Window Film                             | May-18          | \$6,472            | \$834                    | 8,757            | 7                                  | 7.8                              |
|                    | Overton Lodge              | HVAC  | May-18          | \$17,942           | \$1,806                  | 18,963           | 15                                 | 9.9                              |
|                    | Recreation Lodge           | Mini-Split  | May-18          | \$8,680            | \$666                    | 6,993            | 5                                  | 13.0                             |
|                    | Ranger Office              | Mini-Split  | May-18          | \$7,000            | \$930                    | 8,941            | 7                                  | 7.5                              |
|                    | Campground Bathhouse 2     | Mini-Split  | May-18          | \$3,418            | \$630                    | 6,615            | 5                                  | 5.4                              |
|                    | Visitor's Center           | Wood Stove  | May-18          | \$2,300            | \$463                    | 4,862            | 4                                  | 5.0                              |
| Linen House        | Mini-Split                 | May-18  | \$3,418         | \$518              | 5,439                    | 4                | 6.6                                |                                  |
| Sycamore Shoals    | Museum                     | Lighting, Window Film, Doors                            | Jan-16          | \$50,731           | \$4,866                  | 51,093           | 40                                 | 10.4                             |
| T.O Fuller         | Park Office                | Lighting/Sensors, Programmable Thermostat, Water Heater | Oct-15          | \$6,500            | \$2,148                  | 2,649            | 2                                  | 3.0                              |
|                    | Campground Bathhouse       | Lighting/Sensors, Skylights                             | Oct-15          | \$4,766            | \$1,537                  | 16,139           | 13                                 | 3.1                              |
|                    | Clubhouse                  | Lighting, HVAC, Refrigerator, Icemaker                  | Dec-16          | \$14,996           | \$1,024                  | 10,752           | 8                                  | 14.6                             |
|                    | Bathhouses                 | Hand Dryers   | Aug-18          | \$8,400            | \$350                    | 3,675            | 3                                  | 24.0                             |
|                    | Picnic Shelters            | Hand Dryers, Lighting                                   | Aug-18          | \$8,671            | \$265                    | 2,783            | 2                                  | 32.7                             |
| Tims Ford          | Recreation Hall            | Lighting  | Dec-16          | \$361              | \$204                    | 2,142            | 2                                  | 1.8                              |
| Warriors Path      | Golf Course                | Solar Light, Lighting                                   | Apr-17          | \$1,361            | \$410                    | 4,305            | 3                                  | 3.3                              |
| <b>TOTAL</b>       |                            |   |                 | <b>\$4,517,337</b> | <b>\$426,638</b>         | <b>4,407,932</b> | <b>3,438</b>                       | <b>10.6</b>                      |

**TABLE 2**  
**Deferred Maintenance Projects**

| <b>STATE PARK</b> | <b>BUILDING</b>       | <b>PROJECT</b>            | <b>COST</b> |
|-------------------|-----------------------|---------------------------|-------------|
| Big Ridge         | Cabins                | HVAC                      | \$79,000    |
| Big Ridge         | Various Bldgs         | HVAC                      | \$33,000    |
| Big Ridge         | Parkwide              | Water Heater              | \$43,000    |
| Big Ridge         | Office/Visitor Center | Windows and Doors         | \$9,600     |
| Bledsoe Creek     | Laundry               | HVAC                      | \$5,000     |
| Bledsoe Creek     | Laundry               | Water Heater              | \$4,000     |
| Booker T          | Lodge Dormitories     | HVAC                      | \$16,000    |
| Cedars of Lebanon | Cabins                | HVAC                      | \$45,000    |
| Cedars of Lebanon | Cabins                | Water Heater              | \$5,000     |
| Cedars of Lebanon | Cabins                | Windows and Doors         | \$25,000    |
| Chickasaw         | Group Lodge           | Windows and Water Heater  | \$24,000    |
| Cumberland Mtn    | Delux Cabins          | HVAC                      | \$16,000    |
| Cumberland Mtn    | Timber Lodges         | HVAC                      | \$11,000    |
| Cumberland Mtn    | Restaurant            | Insulation                | \$4,000     |
| Cumberland Mtn    | Timber Lodges         | Insulation                | \$30,000    |
| Cumberland Mtn    | ProShop               | HVAC                      | \$28,000    |
| David Crockett    | Cabins 1-7            | Water Heaters             | \$15,000    |
| David Crockett    | Office                | Water Heater              | \$3,500     |
| Fall Creek Falls  | Lodge 1 and 2         | Water Heater              | \$20,000    |
| Fall Creek Falls  | Nature Center         | Water Heater              | \$1,000     |
| Fall Creek Falls  | Bathhouses            | Water Heater              | \$14,000    |
| Fall Creek Falls  | Lodge 1 and 2         | Windows and Doors         | \$60,000    |
| Fall Creek Falls  | Nature Center         | Windows and Doors         | \$3,500     |
| Fall Creek Falls  | Bathhouses            | Windows and Doors         | \$43,000    |
| Fort Loudoun      | Bathhouse             | Lighting                  | \$1,500     |
| Harpeth River     | Visitor Center        | Doors                     | \$3,500     |
| Harrison Bay      | Interpretive Center   | HVAC                      | \$15,000    |
| Harrison Bay      | ProShop               | HVAC                      | \$28,000    |
| Harrison Bay      | Camp Store            | HVAC, Insulation, Windows | \$15,000    |
| Indian Mountain   | New Bathhouse         | Solar                     | \$30,000    |
| Meeman Shelby     | Office Visitor Center | Lighting                  | \$15,000    |
| Meeman Shelby     | Nature Center         | Windows                   | \$15,000    |
| Meeman Shelby     | Maintenance Building  | Lighting                  | \$10,000    |
| Montgomery Bell   | Campground            | Water Heater              | \$1,000     |
| Montgomery Bell   | Ranger Station        | Water Heater              | \$2,000     |
| Montgomery Bell   | Park Office           | Water Heater              | \$2,000     |
| Montgomery Bell   | Group Camp 1          | Water Heater              | \$1,000     |
| Montgomery Bell   | Warehouse             | Windows and Doors         | \$4,000     |
| Montgomery Bell   | Campground            | Windows and Doors         | \$5,000     |
| Montgomery Bell   | Maintenance Building  | Windows and Doors         | \$7,000     |
| Montgomery Bell   | Swimming pool         | Windows and Doors         | \$10,000    |
| Montgomery Bell   | Visitor Center        | Windows and Doors         | \$20,000    |
| Montgomery Bell   | Maintenance Building  | Windows and Doors         | \$10,000    |
| Mousetail Landing | Office                | Water Heater              | \$4,000     |
| Natchez Trace     | Pin Oak Lodge         | HVAC                      | \$99,900    |
| Natchez Trace     | Pin Oak Lodge         | HVAC                      | \$60,000    |
| Natchez Trace     | Group Camp            | HVAC                      | \$30,000    |
| Natchez Trace     | Cub Lake Cabins       | HVAC                      | \$96,000    |
| Natchez Trace     | Park Office           | HVAC                      | \$40,000    |
| Natchez Trace     | Wrangler Campground   | Lighting                  | \$1,300     |
| Natchez Trace     | Group Camp Bunkhouse  | Lighting                  | \$500       |

**TABLE 2**  
**Deferred Maintenance Projects**

| <b>STATE PARK</b> | <b>BUILDING</b>          | <b>PROJECT</b>           | <b>COST</b> |
|-------------------|--------------------------|--------------------------|-------------|
| Natchez Trace     | group camp               | Lighting                 | \$5,000     |
| Natchez Trace     | Cub Lake Cabins          | Lighting                 | \$2,400     |
| Natchez Trace     | Park Office              | Lighting                 | \$3,200     |
| Natchez Trace     | Pin Oak Lodge            | Lighting                 | \$12,700    |
| Natchez Trace     | Pin Oak Lodge            | Lighting                 | \$10,000    |
| Natchez Trace     | Pin Oak Lodge            | Water Heater             | \$50,000    |
| Natchez Trace     | Pin Oak Lodge            | Water Heater             | \$45,000    |
| Natchez Trace     | RV Campground            | Water Heater             | \$30,000    |
| Natchez Trace     | Wrangler Campground      | Water Heater             | \$40,000    |
| Natchez Trace     | Group Camp Bunkhouse     | Water Heater             | \$30,000    |
| Natchez Trace     | Park Office              | Windows and Doors        | \$30,000    |
| Natchez Trace     | Visitor's Center         | Water Heater             | \$3,500     |
| NB Forrest        | Group Camp               | Windows                  | \$20,000    |
| NB Forrest        | Group Camp Kitchen       | Windows                  | \$30,000    |
| NB Forrest        | Group Camp Kitchen       | Boiler                   | \$40,000    |
| NB Forrest        | Cabins 6 & 7             | Water Heaters            | \$10,000    |
| Norris Dam        | AAA Cabins               | HVAC                     | \$35,000    |
| Norris Dam        | Wedding Cottage          | HVAC                     | \$6,000     |
| Norris Dam        | Village Green Linen Room | Insulation               | \$20,000    |
| Norris Dam        | Wedding Cottage          | Insulation               | \$8,000     |
| Norris Dam        | Visitor Center           | Windows and Doors        | \$60,000    |
| Norris Dam        | Village Green Linen Room | Windows and Doors        | \$20,000    |
| Norris Dam        | Village Green            | Lighting                 | \$20,000    |
| Norris Dam        | Campground Bathhouses    | Lighting                 | \$8,000     |
| Panther Creek     | Auxiliary Building       | HVAC                     | \$6,000     |
| Panther Creek     | Maintenance Building     | HVAC                     | \$8,700     |
| Panther Creek     | Maintenance Building     | Insulation               | \$15,600    |
| Panther Creek     | Auxiliary Building       | Water Heater             | \$1,000     |
| Panther Creek     | Ranger Station           | Water Heater             | \$800       |
| Panther Creek     | Pool Building Bathhouse  | Water Heater             | \$2,700     |
| Panther Creek     | Auxiliary Building       | Windows and Doors        | \$7,500     |
| Panther Creek     | Maintenance Building     | Windows and Doors        | \$2,000     |
| Paris Landing     | Office                   | HVAC                     | \$15,000    |
| Paris Landing     | Various Bldgs            | Lighting                 | \$14,000    |
| Paris Landing     | Cabins                   | Water Heater             | \$25,000    |
| Paris Landing     | Pro Shop                 | HVAC                     | \$25,000    |
| Paris Landing     | Pro Shop                 | Windows and Water Heater | \$35,000    |
| Pickett           | Ranger Station           | HVAC                     | \$7,200     |
| Pickett           | Cabin 6-10               | HVAC                     | \$30,000    |
| Pickett           | Visitor Center           | HVAC                     | \$15,000    |
| Pickett           | Ranger Station           | Insulation               | \$2,000     |
| Pickett           | Visitor Center           | Lighting                 | \$3,500     |
| Pickett           | Ranger Station           | Windows and Doors        | \$15,000    |
| Pickett           | Cabin 6-10               | Windows and Doors        | \$50,000    |
| Pickett           | Ranger Station           | Lighting                 | \$3,000     |
| Pickett           | Cabins 6-10              | Lighting                 | \$7,000     |
| Pickett           | Group Camp Bunkhouse     | Windows                  | \$10,000    |
| Pickett           | Group Camp Bathhouses    | HVAC                     | \$10,000    |
| Pickett           | Nature Center            | HVAC and Window Film     | \$9,000     |
| Pickett           | Campground Bathhouse     | HVAC and Windows         | \$20,000    |
| Pickwick          | Cabin 1-10               | Lighting                 | \$10,000    |

**TABLE 2**  
**Deferred Maintenance Projects**

| <b>STATE PARK</b> | <b>BUILDING</b>            | <b>PROJECT</b>    | <b>COST</b>        |
|-------------------|----------------------------|-------------------|--------------------|
| Pickwick          | Park Office                | Water Heater      | \$3,500            |
| Pinson Mounds     | Bunkhouse                  | HVAC              | \$16,000           |
| Reelfoot          | Parkwide                   | Lighting          | \$7,000            |
| Reelfoot          | Park Office                | Windows and Doors | \$7,500            |
| Reelfoot          | Visitor Center             | Doors             | \$8,000            |
| Roan Mountain     | Visitor Center/Pool        | Windows and Doors | \$15,000           |
| Roan Mountain     | Picnic Shelter 1 Restrooms | Lighting          | \$10,000           |
| Roan Mountain     | Cabins 1-20                | Water Heater      | \$80,000           |
| Standing Stone    | Office                     | Window Film       | \$3,000            |
| Standing Stone    | Ranger Office              | Mini-split        | \$7,000            |
| Standing Stone    | Tea Room                   | HVAC              | \$15,000           |
| Standing Stone    | Tea Room                   | Window Film       | \$10,000           |
| Standing Stone    | Campground Bathhouses      | Water Heater      | \$20,000           |
| TO Fuller         | Office                     | Water Heater      | \$3,500            |
|                   |                            | <b>TOTAL</b>      | <b>\$2,158,600</b> |

**TABLE 3**  
**Golf Electrification Project**

|                | STATE PARK       | PROJECT                             | TOTAL COST         | ESTIMATED ANNUAL SAVINGS  |   |
|----------------|------------------|-------------------------------------|--------------------|---------------------------|---|
|                |                  |                                     |                    | COST <sup>1</sup><br>(\$) | EMISSIONS <sup>2</sup><br>(Tons of CO <sub>2</sub> e) |
| <b>PHASE 1</b> |                  |                                     |                    |                           |   |
|                | Harrison Bay     | Purchased 18 Electric Mowers        | \$435,783          | \$79,500                  | 361   |
| <b>PHASE 2</b> |                  |                                     |                    |                           |   |
|                | Montgomery Bell  | Golf Cart Conversion<br>(216 Carts) | \$175,000          | \$28,120                  | 86  |
|                | Henry Horton     |                                     |                    |                           |   |
|                | Fall Creek Falls |                                     |                    |                           |   |
| <b>PHASE 3</b> |                  |                                     |                    |                           |   |
|                | Paris Landing    | Golf Cart Conversion<br>(210 Carts) | \$150,000          | \$25,200                  | 84  |
|                | Pickwick Landing |                                     |                    |                           |   |
|                | Warriors Path    |                                     |                    |                           |   |
| <b>PHASE 4</b> |                  |                                     |                    |                           |   |
| <b>2015</b>    |                  |                                     |                    |                           |   |
|                | Tims Ford        | Purchased 3 Electric Mowers         | \$111,015          | \$48,600                  | 221   |
|                | Montgomery Bell  | Purchased 3 Electric Mowers         | \$111,015          |                           |   |
|                | Warriors Path    | Purchased 3 Electric Mowers         | \$99,261           |                           |   |
|                | Pickwick Landing | Purchased 2 Electric Mowers         | \$74,010           |                           |   |
| <b>2016</b>    |                  |                                     |                    |                           |   |
|                | Henry Horton     | Purchased 4 Electric Mowers         | \$150,981          | \$48,600                  | 221   |
|                | Fall Creek Falls | Purchased 3 Electric Mowers         | \$101,246          |                           |   |
|                | Paris Landing    | Purchased 3 Electric Mowers         | \$113,236          |                           |   |
|                | Pickwick Landing | Purchased 1 Electric Mower          | \$37,745           |                           |   |
| <b>TOTAL</b>   |                  |                                     | <b>\$1,559,292</b> | <b>\$230,020</b>          | <b>973</b>  |

<sup>1</sup> Annual cost savings based on estimated avoided gasoline cost (\$2.20/gal) and usage

<sup>2</sup> Annual emissions savings based on avoided gasoline usage. Conversion to Tons of CO<sub>2</sub>e using EPA GHG Equivalencies Calculator.