A.G. GASTON BOYS & GIRLS CLUB
2900 S Park Dr. SW, Birmingham, AL 35211

Project Overview

The Kirkwood Balton Unit of the A.G. Gaston Boys & Girls Club in Birmingham has a heated indoor pool, which is a great asset, but can be expensive to maintain. The pool had been in operation for nearly 40 years, and had developed several leaks. These leaks, as well as irrigation system leaks were located and repaired. A pool blanket was purchased and installed on the pool surface whenever the pool is unoccupied to prevent evaporation losses, saving water, pool chemicals, and pool heating energy.

New Web-based thermostats with integral occupancy sensors were installed to improve control of facility HVAC systems.

Other improvements include new LED lighting in the natatorium and conference room, 0.5 GPM faucet aerators, 1.5-GPM showerheads, and a new tankless water-heating system to serve the boys’ locker room.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (CCF)</td>
</tr>
<tr>
<td>High-priority lighting efficiency upgrades &amp; lighting controls</td>
<td>-</td>
</tr>
<tr>
<td>Pool &amp; irrigation system repairs</td>
<td>962</td>
</tr>
<tr>
<td>Install a pool blanket when pool not in use</td>
<td>69</td>
</tr>
<tr>
<td>Install Web-based programmable thermostats for five rooftop HVAC systems, and replace boys’ locker room water-heating system with high-efficiency system</td>
<td>-</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>27%</td>
</tr>
</tbody>
</table>

Site Details

- Average daily attendance of 181
- 27,877 square feet
- Constructed in 1977

Energy & Water Benchmarks

- Over $70,000 in baseline utilities cost
- 11 million Btu of energy per member per year
- 8,400 gallons of water per member per year

Improvements

- Invested $36,471, or $1.29 per sq. ft.
- Predicted return on investment (ROI) of 45%
- Actual savings – after only 8 months – of over $33,000, 39% energy savings, and 52% water savings

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program's ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

Figure 1: Pool Leakage Testing

Leak detection specialists were able to locate and repair several leaks in the pool, saving water, pool chemicals, and water heating energy.

Figure 2: Setting up the Pool Blanket

The new pool blanket (above and below) reduces evaporation losses of water and energy when the pool is unoccupied.

Figure 3: Pool Blanket after Installation

Figure 4: Irrigation System Submeter

Locating and monitoring the irrigation system submeter has enabled the club to monitor irrigation water use and minimize future irrigation system leaks.

Figure 5: Smart Web-based Thermostats

All thermostats were replaced with smart Web-based thermostats with integral occupancy sensors. These include online monitoring capabilities of outside temperature, indoor temperature, indoor setpoint, occupancy status, and operating schedules.
Project Overview

The Rick & Rita Case Club was especially pleased with the new bi-level LED outdoor lighting installed under the scope of the Energy & Water Efficiency Program. Outdoor fixtures have integral occupancy sensors and photocells that ensure that lighting is available when needed. The occupancy sensors allow the fixtures to dim when no one is nearby, thereby reducing light pollution for the adjacent residential community.

Interior lighting was also converted to LED, reducing peak lighting power by more than 50 percent while improving lighting quality and reliability. Occupancy-based lighting controls were installed throughout the facility in a vacancy mode, where fixtures are turned on manually if needed, and then turn off if inadvertently left on when areas are unoccupied.

Other improvements include new thermostats, vending machine controls to reduce plug loads, and window film to reduce solar heat gain.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior &amp; exterior LED lighting &amp; controls</td>
<td>$2,490</td>
<td>75</td>
<td>235</td>
</tr>
<tr>
<td>Install smart thermostats</td>
<td>$1,549</td>
<td>47</td>
<td>146</td>
</tr>
<tr>
<td>Install vending machine controls</td>
<td>$131</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Install window film</td>
<td>$206</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td><strong>Projected Total Savings, Cost, &amp; ROI</strong></td>
<td>15%</td>
<td>22%</td>
<td>22%</td>
</tr>
</tbody>
</table>

- Average daily attendance of 191
- 8,681 square feet
- Constructed in 2004

Energy Benchmarks

- $22,882 in baseline utilities cost
- 2 million Btu of energy per member per year

Improvements

- Invested $37,938, or $4.37 per sq. ft.
- Predicted return on investment (ROI) of 9%
- Actual savings – after 7 months – 4% energy savings

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program's ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlight

Existing thermostats were replaced with a small-scale energy management system to facilitate scheduling and setpoints of HVAC systems. Figure 1 shows one of the control pages for the system serving the lobby area.

Vending machine controls were installed to reduce plug loads during unoccupied periods.

Outdoor building-mounted and pole lighting (Figures 4 and 5) was converted to bi-level LED, with integral photocells and occupancy sensors that increase lighting levels when someone is nearby, and turn off outdoor lighting automatically during the daytime.
CARL ROLLINS UNIT
1013 Underwood St., Dalton, GA 30721

Project Overview
The Carl Rollins Unit of the Boys & Girls Clubs of Chattooga, Gordon, Murray, and Whitfield Counties in Georgia was able to improve summertime comfort significantly by reducing air-conditioning loads through replacement of inefficient lighting with high-performance LED.

Existing 400W metal halide gymnasium lighting was replaced with new 240W LED fixtures with dimming controls, and fluorescent lighting was also replaced with LED. The new lighting in the gym turns on instantly, whereas the old metal halide lighting took several minutes to warm up to full brightness.

Other improvements include new Web-based smart thermostats, removing vending machines to reduce plug loads, and replacing standard plumbing fixtures with low-flow fixtures.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (kgallon)</td>
</tr>
<tr>
<td>LED lighting &amp; controls</td>
<td>-</td>
</tr>
<tr>
<td>Install smart thermostats and complete minor repairs to HVAC</td>
<td>-</td>
</tr>
<tr>
<td>Replace exterior doors</td>
<td>-</td>
</tr>
<tr>
<td>Remove vending machines</td>
<td>-</td>
</tr>
<tr>
<td>Replace existing 3+ GPF water closets with 1.28 GPF, and 0.5 GPF urinals with pint-flush</td>
<td>45</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>24%</td>
</tr>
</tbody>
</table>

Site Details
- Average daily attendance of 101
- 12,000 square feet
- Constructed in 1989

Energy & Water Benchmarks
- $19,051 in baseline utilities cost
- 6 million Btu of energy per member per year
- 1,059 gallons of water per member per year

Improvements
- Invested $67,161, or $5.60 per sq. ft.
- Predicted return on investment (ROI) of 8%
- Actual savings – after only 7 months – of $4,745, 21% energy savings, and 43% water savings

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program’s ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

Figure 1: Web-based Thermostat Trends

New Web-based thermostats for HVAC systems are controllable online or via smartphone providing access so clubs can view conditions and trends and so Southface can assist in fine-tuning HVAC operations. The graphic above illustrates that HVAC system operation correlates closely to periods of occupancy, thus the club is doing a good job in scheduling their systems in this particular area.

Figure 2: Vending Machines Removed

The club has removed their vending machines to reduce energy use and cost, and to promote healthy habits!

Pint-flush urinals use 75% less water than previous fixtures.

Figure 3: New Pint Flush Urinals

Existing lighting throughout was replaced with high-performance LED with occupancy/vacancy controls.

Figure 4: New LED Lighting & Controls Throughout

Having the board engaged helped ensure top-down support for club staff on project implementation.

Figure 5: Engaged Board of Directors
Project Overview
Fort Walton’s Boys & Girls Club was designed to be energy efficient, using a geothermal heat pump system to provide heating and air conditioning. However, the geothermal system and the computer-based building automation system require ongoing expertise that can be hard to find outside of major cities. The central lighting controls installed have also been difficult to use.

Southface technical staff worked with club staff to locate local mechanical contractors qualified to troubleshoot several equipment and controls problems limiting the efficiency of the geothermal system. Repairs were made to the system to enable shutdown of non-essential loads during unoccupied periods. The building automation system was expanded to include HVAC systems in the teen center. Club staff then received training in the use of the building automation system to set schedules and temperatures for HVAC systems. Although improvements have been made, this club is in need of skilled retro-commissioning of mechanical and lighting systems in order to be operating at peak efficiency.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Cost</th>
<th>Million Btu (Site)</th>
<th>Million Btu (Source)</th>
<th>CO2 Emissions (tonnes)</th>
<th>Project Cost</th>
<th>Project Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior &amp; exterior LED lighting &amp; controls</td>
<td>$1,039</td>
<td>36</td>
<td>113</td>
<td>5.1</td>
<td>$19,625</td>
<td>5%</td>
</tr>
<tr>
<td>Install smart thermostats</td>
<td>$1,896</td>
<td>66</td>
<td>206</td>
<td>9.3</td>
<td>$19,201</td>
<td>10%</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>15%</td>
<td>22%</td>
<td>22%</td>
<td>22%</td>
<td>$38,826</td>
<td>6%</td>
</tr>
</tbody>
</table>

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program’s ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

The picture above shows one of the control pages of the club’s building automation system. Many HVAC systems were originally scheduled to provide occupied setpoints from 6am to 9pm, seven days per week, even though actual operating hours were much shorter, and the facility was not used on weekends. Schedules were revised to reflect current operating hours and staff were trained in the use of the system’s scheduling capabilities.

Trends for the geothermal loop pump indicated that it was operating 24/7, which is a common, yet unexpected, condition on many geothermal systems.

Existing 400W metal halide gymnasium lighting was replaced with new 240W LED fixtures with dimming controls. The new lighting in the gymnasium turns on instantly, whereas the old metal halide lighting took several minutes to warm up to full brightness. Thus the club can turn off lighting in the gym when it’s not in use without having to worry about the long warm-up period.
FUQUA BOYS & GIRLS CLUB
405 Lovejoy St NW, Atlanta, GA 30313

Project Overview
The Salvation Army’s Fuqua Boys & Girls Club in Atlanta was originally equipped with programmable thermostats that were not user friendly. This common problem often contributes to unintended HVAC system operation during unoccupied periods. These thermostats were upgraded to Web-based energy management controls.

Other improvements include installing LED lighting and occupancy-based lighting controls throughout, a new drinking fountain with a filtered water bottle refill station, vending machine controls, adding a timer to the domestic hot water circulating pump, and replacing standard plumbing fixtures with low-flow fixtures.

Energy & Water Benchmarks
- $40,472 in baseline utilities cost
- 7 million Btu of energy per member per year
- 496 gallons of water per member per year

Improvements
- Invested $78,681 (including club contribution), or $4.55 per sq. ft.
- Predicted return on investment (ROI) of 15%
- Actual savings – after only 8 months – of over $16,000, 45% energy savings, and 3% water savings

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<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Water (CCF)</td>
</tr>
<tr>
<td>Install high-performance LED lighting throughout, with occupancy controls.</td>
<td>-</td>
</tr>
<tr>
<td>Install web-based programmable thermostats with temperature control &amp; humidity monitoring</td>
<td>-</td>
</tr>
<tr>
<td>Install timer for domestic hot water circulating loop</td>
<td>-</td>
</tr>
<tr>
<td>Install high-efficiency drinking fountain with bottle fill station</td>
<td>-</td>
</tr>
<tr>
<td>Install vending machine controls on drink machines</td>
<td>-</td>
</tr>
<tr>
<td>Replace gas range with standing pilots with pilotless</td>
<td>$4,365</td>
</tr>
<tr>
<td>Replace plumbing fixtures with low-flow fixtures, including 0.5 GPM aerators, 1.28 GPF water closets, and pint-flush urinals</td>
<td>21</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>24%</td>
</tr>
</tbody>
</table>

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program’s ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

Figure 1: Gymnasium with New LEDs

Existing 400W metal halide gymnasium lighting was replaced with high-performance 240W LED with occupancy/vacancy controls.

Figure 2: Vending Machines

Vending machine controls ensure vending machine lighting stays off when the club is unoccupied.

Figure 3: Rooftop HVAC Systems

All facility HVAC systems are now under energy management control.

Figure 4: Gas Range with Standing Pilots

The original gas range had several standing pilots, which waste energy 24/7 and can impact air quality. The range was replaced with a unit having electronic ignition.

Figure 5: New Drinking Fountain with Bottle Fill Station

Everybody loves the filtered water from the new drinking fountain with bottle fill station!
Project Overview

The Greenwood facility of the Boys & Girls Clubs of the Mississippi Delta had obsolete and unsealed penetrations in the ceiling that resulted in unwanted air infiltration and related energy losses. R-20 spray foam insulation was installed under the roof deck on the older section of the building, and all obsolete penetrations were removed or sealed.

Other improvements include a new drinking fountain with filtered water bottle refill station, two new ENERGY STAR HVAC systems, point-of-use water heaters, Web-based smart thermostats, new windows and doors, and stormwater management improvements.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (gallon)</td>
<td>Costs</td>
<td>Million Btu (Site)</td>
</tr>
<tr>
<td>1. Install high-performance lighting and controls</td>
<td>8</td>
<td>$1,656</td>
<td>118</td>
</tr>
<tr>
<td>2. Replace obsolete windows and doors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Redirect stormwater away from the building</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Install R-20 spray foam insulation in the old section of the building</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Air-seal all penetrations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Install two ENERGY STAR HVAC systems and three Web-based smart thermostats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Install pint-flush urinal and 0.5-GPM aerators on restroom faucets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Install point-of-use water heaters and drinking fountain with filtered water bottle refill station</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Projected Total Savings, Cost, & ROI

| | 20% | 20% | 20% | 20% | 20% | $78,496 | 2% |

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program's ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA's mission.
Project Highlights

Windows and doors that were in poor condition were replaced with high-performance units, improving energy efficiency, comfort, and access to daylighting and views.

Obsolete metal halide basketball court lighting, interior fluorescent lighting, and outdoor soffit lighting were all replaced with LED. Outdoor lighting is equipped with integral bi-level and photocell controls, getting brighter at night when someone is nearby, and turning off in the daytime.

All HVAC systems are now controllable online or via smartphone using new thermostats that Southface can view as well to assist in fine-tuning HVAC operations.
RICK & SUSAN GOINGS BOYS & GIRLS CLUB  
51 Lewis Rd., Hemingway, SC 29554  

ENERGY & WATER EFFICIENCY PROGRAM OVERVIEW  
September 2015  

Site Details  
- Average daily attendance of 114  
- 25,930 square feet  
- Constructed in 1970  

Energy & Water Benchmarks  
- $18,290 in baseline utilities cost  
- 3 million Btu of energy per member per year  
- 1,077 gallons of water per member per year  

Improvements  
- Invested $102,459 (including Tupperware in-house labor valued at $28,382), or $3.95 per sq. ft.  
- Predicted return on investment (ROI) of 4%  
- Actual savings – after 8 months – 5% energy savings  
- Primary benefits to date are based on improved lighting quality & comfort in the gymnasium  

Project Overview  
The Rick & Susan Goings Boys & Girls Club has maintained the distinction of using the least amount of energy per square foot of facility of all of the pilot clubs. Yet they have managed to reduce their energy use by 5% under the Energy & Water Efficiency Program with great support form their corporate partner, Tupperware. Tupperware contributed in-house labor valued at more than $28,000 for project management and installation of five of the seven projects implemented, and they completed their projects in record time. Additionally, Tupperware created a model recycling program, including professional program documentation that will be used as a model for other clubs.  

Projects completed include LED lighting and vacancy controls, R-19 insulation, window film, vending machine controls, low-flow plumbing fixtures, weatherization of the gymnasium, and installation of two ENERGY STAR HVAC systems to replace two failed units serving the gym.  

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Water (k gallon)</td>
<td>Costs</td>
</tr>
<tr>
<td>1. LED lighting &amp; controls throughout</td>
<td>69</td>
<td>$4,267</td>
</tr>
<tr>
<td>2. Replacement of selected HVAC systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Weatherization of gymnasium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Vending machine controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Window film</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. R-19 insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Low-flow plumbing fixtures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>31%</td>
<td>23%</td>
</tr>
</tbody>
</table>

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Project Highlights

New Pint-flush urinals use 87% less water than previous.

Restroom faucet aerators rated at 0.5 gallons per minute use 77% less water than previous.

New HVAC systems use CO₂ controls to modulate fresh air delivered to the gymnasium.

Tupperware, the club’s corporate partner, created a model recycling program for the Rick & Susan Goings Club that will be used as a template for other clubs.

Projects under consideration for future include adding a reflective coating to the gymnasium roof.
Project Overview

The Hueytown Boys & Girls Club has a heated indoor pool, which is a great asset, but can be expensive to maintain. A pool blanket was purchased and installed on the pool surface whenever the pool is unoccupied to prevent evaporation losses, saving water, pool chemicals, and pool heating energy.

Existing 400W metal halide gymnasium lighting was replaced with new 240W LED fixtures with dimming controls, and most fluorescent lighting was also replaced with LED. The new lighting in the gym turns on instantly, whereas the old metal halide lighting took several minutes to warm up to full brightness. Thus the club can turn off lighting in the gym when it’s not in use without having to worry about the long warm-up period.

Other improvements include occupancy-based lighting controls throughout, adding a timer to the domestic hot water circulating loop, 0.5 GPM aerators for faucets, and new 1.5-GPM showerheads.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (CCF)</td>
<td>Costs</td>
<td>Million Btu (Site)</td>
</tr>
<tr>
<td>High-priority lighting efficiency upgrades &amp; lighting controls</td>
<td>-</td>
<td>$7,420</td>
<td>171</td>
</tr>
<tr>
<td>Install Web-based smart thermostats on HVAC systems</td>
<td>-</td>
<td>$1,612</td>
<td>77</td>
</tr>
<tr>
<td>Install a pool blanket when pool not in use to eliminate evaporation losses</td>
<td>131</td>
<td>$5,824</td>
<td>180</td>
</tr>
<tr>
<td>Install timer on domestic hot water circulating pump</td>
<td>-</td>
<td>$265</td>
<td>19</td>
</tr>
<tr>
<td><strong>Projected Total Savings, Cost, &amp; ROI</strong></td>
<td>25%</td>
<td>21%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Site Details

- Average daily attendance of 164
- 28,539 square feet
- Constructed in 1990

Energy & Water Benchmarks

- $59,000 in baseline utilities cost
- 10 million Btu of energy per member per year
- 3,695 gallons of water per member per year

Improvements

- Invested $77,061 (including $15,000 club investment), or $2.70 per sq. ft.
- Predicted return on investment (ROI) of 16%
- Actual savings – after 5 months – of over $2,945, and 18% energy savings

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program’s ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

The new pool blanket (below) eliminates evaporation losses of water and energy when the pool is unoccupied.

HVAC systems are now controllable online or via smartphone using the new thermostats with integral occupancy sensors. These include online monitoring capabilities of outside temperature, indoor temperature, indoor setpoint, occupancy status, and operating schedules.

Outdoor lighting was previously controlled by a mechanical timeclock, requiring manual seasonal adjustments.
Site Details
- Average daily attendance of 146
- 32,2000 square feet
- Constructed in 2006

Energy Benchmarks
- $46,581 in baseline utilities cost
- 16 million Btu of energy per member per year
- 1,966 gallons of water per member per year

Improvements
- Invested $76,531 (including club contribution), or $2.39 per sq. ft.
- Predicted ROI of 12%
- Last inspection completed in August 2015; savings pending planned maintenance of gym HVAC

Project Overview
The Oprah Winfrey Boys & Girls Club in Kosciusko, Mississippi, includes a mechanical system designed to be energy efficient, using a chilled-water system for air conditioning and gas boiler for heating. However, the HVAC and computer-based building automation systems require ongoing preventive maintenance and expertise of outside contractors that can be a drain on the club’s operating budget.

Humidity control needed in the Southeast requires calibrated sensors and control sequences of operations to meet comfort requirements in the most energy-efficient manner. After completion of pending maintenance tasks (coil cleaning), the club’s mechanical and controls contractor should be able to optimize funded upgrades made to the building automation system to improve the overall operating efficiency of the mechanical systems. Mechanical system upgrades funded by the Energy & Water Efficiency Program include variable-speed drives for fan systems, CO₂ controls for modulation of fresh air dampers, and improved monitoring of space humidity. Although improvements have been made, this club is in need of preventive maintenance and skilled retro-commissioning of HVAC systems in order to be operating at peak efficiency.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost</td>
<td>Million Btu (Site)</td>
<td>Million Btu (Source)</td>
</tr>
<tr>
<td>Interior LED lighting &amp; controls</td>
<td>$3,289</td>
<td>113</td>
<td>356</td>
</tr>
<tr>
<td>Variable-speed drives and controls upgrades</td>
<td>$7,636</td>
<td>437</td>
<td>866</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>19%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

About the Boys & Girls Clubs of America Energy & Water Efficiency Grant Program (BGCA EWEP): The Southeast Region of BGCA was selected to participate in an important pilot program to demonstrate the economic and environmental benefits of high-impact energy and water efficiency improvements in club facilities. Funded by The JPB Foundation, the program's ultimate goals were to reduce club utility expenses by 20 percent annually and to improve conditions in existing facilities, so they may be better used in support of BGCA’s mission.
Project Highlights

The new lighting in the gymnasium turns on instantly, whereas the old fluorescent lighting took several minutes to warm up to full brightness. Thus the club can turn off lighting in the gym when it’s not in use without having to worry about the long warm-up period. Further, the new gymnasium LEDs have a warranty period of ten years, which will reduce the maintenance cost of the frequent lamp changes needed by the previous compact fluorescents.

Lighting throughout the club interior was replaced with LED and vacancy controls to turn off lights in unoccupied areas. Existing compact fluorescent gymnasium lighting was replaced with new LED fixtures with dimming controls. Interior lighting throughout the club was also converted to LED. New light levels are far superior to previous, especially considering that there was a significant number of lamps that were burned out and difficult to access for replacement.

Projects recommended for future consideration include replacement of the expansive amount of outdoor lighting with bi-level LED so as to minimize lighting pollution.
LENOIR CITY BOYS & GIRLS CLUB
201 N. B St., Lenoir City, TN 37771

Project Overview
The Lenoir City Club of the Boys & Girls Clubs of The Tennessee Valley had several obsolete HVAC systems that were very expensive to maintain. Four of five systems were replaced with high-performance ENERGY STAR rated HVAC systems with CO₂ sensors for demand-controlled ventilation. All facility HVAC systems are now controllable by club staff online or via smartphone using Web-based thermostats that Southface can view as well to assist in fine-tuning HVAC operations.

Other improvements include vending machine controls, and replacing standard plumbing fixtures with low-flow fixtures.

The club loves their new lighting and HVAC, and has realized tremendous maintenance cost savings in addition to the energy and water cost savings.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (kgallon)</td>
</tr>
<tr>
<td>Install high-performance LED lighting throughout with occupancy controls</td>
<td>-</td>
</tr>
<tr>
<td>Replace four old HVAC systems with ENERGY STAR. Install five Web-based smart thermostats with integral occupancy sensors</td>
<td>-</td>
</tr>
<tr>
<td>Install vending machine controls on drink machine</td>
<td>-</td>
</tr>
<tr>
<td>Replace plumbing fixtures with low-flow fixtures, including 0.5 GPM restroom faucet aerators, water closets using 1.28 gallons per flush, and pint-flush urinals</td>
<td>37</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>40%</td>
</tr>
</tbody>
</table>

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Project Highlights

Obsolete HVAC systems (above) were replaced with high-performance HVAC systems with CO₂ sensors for demand-controlled ventilation (below).

Existing 400W metal halide gymnasium lighting was replaced with new 240W LED fixtures with dimming controls, and fluorescent lighting was also replaced with LED. Occupancy controls were installed throughout the facility in a vacancy mode, where fixtures are turned on manually if needed, and then turn off if inadvertently left on when areas are unoccupied.

Pint-flush urinals use 87% less water than previous fixtures!

All thermostats were replaced with smart Web-based thermostats with integral occupancy sensors. The above picture illustrates the online monitoring capabilities, including outside temperature, indoor temperature, indoor setpoint, occupancy status, and operating schedules.
Project Overview

Broward County Florida’s Levine-Slaughter Club has new outdoor lighting that reduces light pollution and energy use by as much as 75%. Building-mounted and pole lighting was converted to bi-level LED, with integral photocells and occupancy sensors that increase lighting levels when someone is nearby, and turn off outdoor lighting automatically during the daytime.

Interior lighting was also converted to LED, reducing peak lighting power by more than 50 percent while improving lighting quality and reliability. Occupancy-based lighting controls were installed throughout the facility in a vacancy mode, where fixtures are turned on manually if needed, and then turn off if inadvertently left on when areas are unoccupied.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Cost</th>
<th>Million Btu (Site)</th>
<th>Million Btu (Source)</th>
<th>CO2 Emissions (tonnes)</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior &amp; exterior LED lighting &amp; controls and vending machine controls</td>
<td>$4,638</td>
<td>139</td>
<td>435</td>
<td>19.7</td>
<td>$59,339</td>
<td>8%</td>
</tr>
<tr>
<td>Install smart thermostats</td>
<td>$4,638</td>
<td>139</td>
<td>435</td>
<td>19.7</td>
<td>$15,661</td>
<td>29%</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>15%</td>
<td>22%</td>
<td>22%</td>
<td>22%</td>
<td>$75,000</td>
<td>10%</td>
</tr>
</tbody>
</table>

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Project Highlights

Existing thermostats were replaced with a small-scale energy management system to facilitate scheduling and setpoints of HVAC systems. The picture above shows one of the control pages for setting system schedules.

Vending machine controls were installed to reduce plug loads during unoccupied periods.

Existing 400W metal halide gymnasium lighting (above) was replaced with new 240W LED fixtures with dimming controls, and fluorescent lighting was also replaced with LED. Occupancy controls were installed throughout the facility in a vacancy mode, where fixtures are turned on manually if needed, and then turn off if inadvertently left on when areas are unoccupied.

The new lighting in the gym (below) turns on instantly, whereas the old metal halide lighting took several minutes to warm up to full brightness. Thus the club can turn off lighting in the gym when it’s not in use without having to worry about the long warm-up period.

Figure 1: Energy Management System Display

Figure 2: Vending Machines Load Controls

Figure 3: EWEP Thank-You Card from Club Members

Figure 4: Old Gymnasium Lighting

Figure 5: New Gymnasium Lighting
MOULTRIE/COLQUITT BOYS & GIRLS CLUB
420 West Central Ave., Moultrie, GA 31768

Project Overview

The Boys & Girls Club of Moultrie/Colquitt County is located in a repurposed appliance store that was originally built in 1945. The club has maintained the distinction of using the least amount of energy and water per club member of all of the pilot clubs, which is amazing considering that they also prepare lunch for members. They do this primarily by actively managing their utilities. For example, one month when their electricity bill went up about $50, they raised the setpoint for air conditioning in their offices from 76°F to 78°F. Another factor contributing to their efficiency is that they don’t have vending machines in the club. (Southface research has identified vending machines as a major plug load in boys & girls clubs.)

Improvements include new Web-based smart thermostats, LED lighting and controls, and replacing standard plumbing fixtures with low-flow fixtures.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Water (kgal)</th>
<th>Costs</th>
<th>Million Btu (Site)</th>
<th>Million Btu (Source)</th>
<th>CO2 Emissions (tonnes)</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED lighting &amp; controls</td>
<td>-</td>
<td>$1,110</td>
<td>26</td>
<td>82</td>
<td>3.7</td>
<td>$12,591</td>
<td>9%</td>
</tr>
<tr>
<td>Install smart thermostats and replace refrigerant line insulation</td>
<td>-</td>
<td>$165</td>
<td>4</td>
<td>12</td>
<td>0.6</td>
<td>$3,100</td>
<td>9%</td>
</tr>
<tr>
<td>Replace 2 windows in foyer to improve daylighting &amp; views</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$846</td>
<td>-</td>
</tr>
<tr>
<td>Install 0.5 GPM aerators on restroom faucets, and replace 2 urinals with pint-flush</td>
<td>7</td>
<td>$38</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$1,225</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Projected Total Savings, Cost, &amp; ROI</strong></td>
<td>11%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>$17,762</td>
<td>6%</td>
</tr>
</tbody>
</table>

Site Details
- Average daily attendance of 158
- 8,480 square feet
- Constructed in 1945

Energy & Water Benchmarks
- $5,362 in baseline utilities cost
- 1 million Btu of energy per member per year
- 394 gallons of water per member per year

Improvements
- Invested $17,762, or $2.09 per sq. ft.
- Predicted return on investment (ROI) of 6%
- Actual savings – after 8 months – of 6% energy savings, with little to no water or cost savings thus far
- Primary benefits to date are based on improved lighting quality & comfort

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Project Highlights

![Moultrie Boys Girls Club](image)

<table>
<thead>
<tr>
<th>Last 7 Days</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Temperature and Set Points</td>
<td></td>
</tr>
<tr>
<td>Outside</td>
<td>Temperature</td>
</tr>
<tr>
<td>09/22 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/23 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/24 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/25 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/26 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/27 6:00pm</td>
<td>60°F</td>
</tr>
<tr>
<td>09/28 6:00pm</td>
<td>60°F</td>
</tr>
</tbody>
</table>

**Figure 1: Web-based Thermostat Trends**

New Web-based thermostats for HVAC systems are controllable online or via smartphone providing access so club staff and Southface can view conditions and trends to assist in fine-tuning HVAC operations. The graphic above illustrates that HVAC system operation correlates closely to periods of occupancy.

![Original Thermostats](image)

**Figure 2: Original Thermostats**

The original thermostats were managed so well that savings from the Web-based thermostats have been small, but staff do like being able to manage their HVAC systems remotely via the Internet.

![Original Reception Area Windows](image)

**Figure 3: Original Reception Area Windows**

Original reception windows (above) were inefficient and boarded over. New windows (below) provide daylight and views.

![New Reception Area Windows](image)

**Figure 4: New Reception Area Windows**

![LED Lighting & Controls](image)

**Figure 5: LED Lighting & Controls**

Existing lighting was replaced with high-performance LED tubes and new ballasts. Occupancy/vacancy controls were installed throughout.
South Rome Boys & Girls Club
211 East Main Street, Rome, GA 30161

Energy & Water Efficiency Program Overview
September 2015

Site Details
- Average daily attendance of 175
- 22,600 square feet
- Constructed in 2009

Energy & Water Benchmarks
- $43,374 in baseline utilities cost
- 5 million Btu of energy per member per year
- 582 gallons of water per member per year

Improvements
- Invested $76,200, or $3.37 per sq. ft.
- Predicted return on investment (ROI) of 13%
- Actual savings – after only 8 months – of over $6,000, 25% energy savings, & 32% water savings

Club Management Comments
“By saving money through this program with our energy efficiency, we’re serving about 36 additional kids each year, at no cost to them, to experience the Boys and Girls Club. Thank you all for your help with this project! It won’t just impact our organization. It will also impact real kids with real needs. What else is more important?”

Walter “J.R.” Davis, Executive Director
Boys & Girls Clubs of Northwest Georgia

### Project Overview
The South Rome Club’s heating and air conditioning systems (HVAC) were designed for peak occupancy, but normal occupancy is generally lower than peak. This resulted in systems that were oversized for most daily attendance levels. EWEP staff worked with the facility’s mechanical and controls contractors to install variable-speed motor drives, CO₂ sensors, and upgrade programming of the building automation system to allow the fan systems to slow down when practical. This reduces energy use and fan noise. The CO₂ sensors control fresh air supply, delivering the right amount of air based on the number of occupants present. Additionally, the computer-based building automation controls were upgraded to provide online access to optimize scheduling of HVAC to minimize operation during unoccupied periods.

Other improvements include LED lighting, an ENERGY STAR refrigerator, adding a rain barrel to collect and store rainwater for the garden, vending machine controls, and replacing standard plumbing fixtures with low-flow fixtures.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install selected high-performance LED lighting and controls</td>
<td>-</td>
<td>$3,543</td>
<td>101</td>
</tr>
<tr>
<td>Convert to seasonal gas rate</td>
<td>-</td>
<td>$1,415</td>
<td>-</td>
</tr>
<tr>
<td>Replace refrigerator with ENERGY STAR</td>
<td>-</td>
<td>$280</td>
<td>6</td>
</tr>
<tr>
<td>Upgrade building automation system</td>
<td>-</td>
<td>$6,560</td>
<td>232</td>
</tr>
<tr>
<td>Install vending machine controls on snack &amp; drink machines</td>
<td>-</td>
<td>$532</td>
<td>12</td>
</tr>
<tr>
<td>Install rainwater harvesting system for the garden</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Replace standard plumbing fixtures with low-flow</td>
<td>25</td>
<td>$508</td>
<td>12</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>13%</td>
<td>24%</td>
<td>16%</td>
</tr>
</tbody>
</table>

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Project Highlights

Southface presented findings of the energy and water assessment to the board of directors who approved the recommended projects.

A 500-gallon rain barrel (above) was installed to collect and store rainwater from the roof to water the club's vegetable garden (below).

Existing 400W metal halide gymnasium fixtures were replaced with 240W LED fixtures with dimming and occupancy controls. Additionally, office and multipurpose room fluorescent fixtures were upgraded to LED. Outdoor fixtures were converted from metal halide to LED, and were equipped with bi-level controls to dim the lighting to minimum levels when no one is nearby, and photocells to turn the lights off during the daytime.

Savings from the energy and water efficiency program enable the South Rome club to direct more funds to its mission of serving its club members.
THOMASVILLE BOYS & GIRLS CLUB
10 Pine St., Thomasville, NC 27360

ENERGY & WATER EFFICIENCY PROGRAM OVERVIEW
September 2015

Site Details
- Average daily attendance of 57
- 5,778 square feet
- Constructed in 1978

Energy & Water Benchmarks
- $9,934 in baseline utilities cost
- 4 million Btu of energy per member per year
- 2,365 gallons of water per member per year

Improvements
- Invested $62,446, or $10.79 per sq. ft.
- Predicted return on investment (ROI) of 6%
- Actual savings – after only 8 months – $1,500, and 21% energy savings

Project Overview
The original building envelope at the Salvation Army’s Boys & Girls Club in Thomasville included a vented attic space with batt insulation on top of a suspended ceiling, which is a very poor system for minimizing air infiltration and associated heat transfer. The batt insulation was removed and replaced by R-20 spray foam insulation on the underside of the roof deck, thereby sealing and insulating the attic, and reducing heating and cooling losses in the HVAC systems located in the attic.

Other improvements include LED lighting and occupancy based controls, weather-stripping exterior doors, installing a new drinking fountain with a filtered water bottle refill station, hand dryers to replace use of paper towels, one new high-efficiency HVAC system, Web-based smart thermostats for all three HVAC systems, and replacing standard plumbing fixtures with low-flow fixtures.

<table>
<thead>
<tr>
<th>Projects Implemented</th>
<th>Predicted Annual Savings</th>
<th>Project Cost</th>
<th>Projected Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water (kgallon)</td>
<td>Costs</td>
<td>Million Btu (Site)</td>
</tr>
<tr>
<td>Install selected high-performance LED lighting and controls.</td>
<td>- $658</td>
<td>22</td>
<td>70</td>
</tr>
<tr>
<td>High-efficiency HVAC and controls</td>
<td>- $1,608</td>
<td>55</td>
<td>171</td>
</tr>
<tr>
<td>Hand dryers in restrooms</td>
<td>- $379</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R-20 spray foam insulation &amp; weather-strip doors</td>
<td>- $709</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>Drinking fountain with bottle fill station to reduce use of disposable bottles</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Replace standard plumbing fixtures with low-flow</td>
<td>18</td>
<td>$290</td>
<td>-</td>
</tr>
<tr>
<td>Projected Total Savings, Cost, &amp; ROI</td>
<td>14</td>
<td>$2,915</td>
<td>81</td>
</tr>
</tbody>
</table>

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Project Highlights

The batt insulation (above) was removed and replaced by R-20 spray foam insulation on the underside of the roof deck (below).

Existing fixtures in the computer lab were in good condition, so the fluorescent tubes were replaced with LED T8 tubes that use half as much energy. The fixtures through the rest of the facility were old; these were replaced with new LED fixtures. Occupancy controls were installed throughout the facility in a vacancy mode, where fixtures are turned on manually if needed, and then turn off if inadvertently left on when areas are unoccupied.

The original drinking fountain (above) was replaced with a new system with a filtered water bottle refill station (below).