Fort Valley State University: Miller Hall

Mid-20th Century Buildings Workshop

Facility Officers Conference/ Columbus, Ga./ 26 October 2011
Fort Valley State University: Miller Hall

Consider the Mid-Century Building

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Campus Map

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Site Plan

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Main Floor Plan

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Miller Hall Energy Study

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### Table 1. Comparison of Current Building, Proposed Building and Further Energy Conservation Opportunities.

<table>
<thead>
<tr>
<th>Project Run</th>
<th>ECO Description</th>
<th>Electricity</th>
<th>Natural Gas</th>
<th>Total Energy</th>
<th>Total Yearly Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Usage (x1,000) kWh</td>
<td>Savings</td>
<td>Usage (x1,000,000) Btu</td>
<td>Savings</td>
</tr>
<tr>
<td>Current Building</td>
<td></td>
<td>515.3</td>
<td>648.1</td>
<td>2406.8</td>
<td>$66,781</td>
</tr>
<tr>
<td>Baseline</td>
<td>renovation baseline</td>
<td>401.9</td>
<td>926.46</td>
<td>2300.1</td>
<td>4.4%</td>
</tr>
<tr>
<td>Reduced Lighting</td>
<td>F28T8 vs F32T8</td>
<td>385.5</td>
<td>933.5</td>
<td>2249.2</td>
<td>2.2%</td>
</tr>
<tr>
<td>R30 Roof</td>
<td>R30 roof insulation</td>
<td>402.7</td>
<td>925.09</td>
<td>2297.4</td>
<td>0.1%</td>
</tr>
<tr>
<td>PVC Roof</td>
<td>PVC membrane on 2-inch f w concrete</td>
<td>399.36</td>
<td>960.66</td>
<td>2330</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Operable Windows</td>
<td>Keep operable windows</td>
<td>400.61</td>
<td>971.83</td>
<td>2339.1</td>
<td>-1.7%</td>
</tr>
<tr>
<td>Insulating Glass</td>
<td>Insulated glass in current window frame</td>
<td>402.18</td>
<td>897.41</td>
<td>2270.1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Aluminum Frame</td>
<td>New alu frame window</td>
<td>401.5</td>
<td>886.99</td>
<td>2257.1</td>
<td>1.9%</td>
</tr>
<tr>
<td>Vinyl Frame</td>
<td>New vinyl frame window</td>
<td>401.52</td>
<td>882.99</td>
<td>2253.4</td>
<td>2.0%</td>
</tr>
<tr>
<td>Daylighting</td>
<td>Daylighting controls</td>
<td>395.09</td>
<td>932.66</td>
<td>2249</td>
<td>2.2%</td>
</tr>
<tr>
<td>VAV</td>
<td>VAV HVAC System</td>
<td>526.04</td>
<td>88.77</td>
<td>1864.1</td>
<td>19.0%</td>
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<tr>
<td>DCV*</td>
<td>DCV estimate</td>
<td>2242.0</td>
<td>2.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRFZ*</td>
<td>Estimate of VRFZ system instead of 4-pipe HVAC system</td>
<td>2016.12</td>
<td>12.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Savings for these ECO are estimates only, as they could not be accurately modeled in eQUEST

### Comparison of Existing Building to Proposed Work
## Fort Valley State University: Miller Hall

### Table 2. Payback and Energy Saved per Investment for each Energy Conservation Opportunity

<table>
<thead>
<tr>
<th>Project Run</th>
<th>ECO Description</th>
<th>Total Energy Usage (x1,000,000 Btu)</th>
<th>Savings</th>
<th>Total Yearly Cost</th>
<th>Cost ($)</th>
<th>Savings</th>
<th>Installation Cost</th>
<th>Payback (years)</th>
<th>Energy Saved per Investment (MBtu/ 1,000 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Building</td>
<td></td>
<td>2406.8</td>
<td></td>
<td></td>
<td>$66,781</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>renovation baseline</td>
<td>2300.1</td>
<td>4.4%</td>
<td></td>
<td>$54,210</td>
<td>18.8%</td>
<td></td>
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<tr>
<td>Reduced Lighting</td>
<td>F29T8 vs F32T8</td>
<td>2249.2</td>
<td>2.2%</td>
<td></td>
<td>$52,233</td>
<td>3.6%</td>
<td>$20,499</td>
<td>10.5</td>
<td>2.5</td>
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<tr>
<td>R30 Roof</td>
<td>R30 roof Insulation</td>
<td>2293.4</td>
<td>0.1%</td>
<td></td>
<td>$54,222</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC Roof</td>
<td>PVC membrane on 2-inch ft w/ concrete</td>
<td>2330</td>
<td>-1.3%</td>
<td></td>
<td>$54,014</td>
<td>0.4%</td>
<td>Not Price</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operable Windows</td>
<td>Keep operable windows</td>
<td>2336.1</td>
<td>-1.7%</td>
<td></td>
<td>$54,163</td>
<td>0.0%</td>
<td>$0</td>
<td></td>
<td>0.0</td>
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<tr>
<td>Insulating Glass</td>
<td>insul glass in current window frame</td>
<td>2270</td>
<td>1.3%</td>
<td></td>
<td>$54,154</td>
<td>0.1%</td>
<td>$131,381</td>
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<td>0.2</td>
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<td>Aluminum Frame</td>
<td>New alu frame window</td>
<td>2257</td>
<td>1.9%</td>
<td></td>
<td>$54,042</td>
<td>0.3%</td>
<td>$164,226</td>
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<td>0.3</td>
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<tr>
<td>Vinyl Frame</td>
<td>New vinyl frame window</td>
<td>2253.4</td>
<td>2.0%</td>
<td></td>
<td>$54,033</td>
<td>0.3%</td>
<td>$65,690</td>
<td>none</td>
<td>0.7</td>
</tr>
<tr>
<td>Daylighting</td>
<td>Daylighting Controls</td>
<td>2249</td>
<td>2.2%</td>
<td></td>
<td>$52,253</td>
<td>3.6%</td>
<td>$40,966</td>
<td>21.0</td>
<td>1.2</td>
</tr>
<tr>
<td>VAV</td>
<td>VAV HVAC System</td>
<td>2184.1</td>
<td>19.0%</td>
<td></td>
<td>$66,708</td>
<td>-23.1%</td>
<td>$25,184</td>
<td>none</td>
<td>17.3</td>
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<tr>
<td>DCV*</td>
<td>DCV estimate*</td>
<td>2242.6</td>
<td>2.5%</td>
<td></td>
<td>$12,885</td>
<td></td>
<td></td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>VRFZ*</td>
<td>Estimate of VRFZ system instead of 4-pipe HVAC system.</td>
<td>2019.12</td>
<td>12.2%</td>
<td></td>
<td>$126,748</td>
<td></td>
<td></td>
<td></td>
<td>2.2</td>
</tr>
</tbody>
</table>

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**Payback and Energy Saved**

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Miller Hall: Programmatic Issues
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Main Floor

Upper Floor

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Classrooms

Offices

Public Spaces

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Miller Hall: Technical Challenges

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Steel Structure with CMU Shear Walls; Low ceiling heights

Systems shared with adjacent buildings

Window and masonry rehabilitation

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Implementation

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The Bottom Line

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Miller Hall $150/square foot (estimated)

vs.

New Construction @ $180-$240/square foot

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