Abstract

There is an excessive amount of heat wasted in the Stoddard complex at WPI due to inefficient and outdated heating systems combined with wasteful behaviors from its residents. The current heating systems in place are outdated, yet to replace the system would be overly expensive and the savings would not be sufficient enough to justify the update (B.Grudzinski, 2016). Our group’s goal is to promote the conservation of heat in Stoddard and update the heating system controls so that less heat is wasted. Mechanically, the goal is to implement the Automated Logic System. According to Bill Grudzinski, Chief Engineer of Heating Systems, the Automated Logic System would help control the range of temperatures and allow the facilities department to monitor heat being used by each room. Behaviorally, we plan to educate students on saving heat through NSO programs, posters on campus, and residential services involvement. The mechanical improvements in conjunction with the behavioral changes would greatly reduce the amount of heat lost in Stoddard.

Background

Line Voltage Thermostats used are inconsistent and outdated

Structure consists of cinder-block walls, bricks, and concrete, with single pane windows

Students have the mentality that the heat waste is not their problem because they don’t pay for it.

Methods

Encouraging Sustainable Behavior (SB)

- Attitudes
- Locus of control
- Personal responsibility
- Well-designed education

Automated Logic System

- Upon surveying the students and taking temperatures in multiple rooms, we found that the heat is inconsistent and the thermostat does not set to a specific temperature
- After reviewing the heating control systems we concluded that the Automated Logic System would best fit the situation
- Connecting the baseboard of the Stoddard Heating System to the Automated Logic System will allow the heat to be controlled by the Facilities Department.
- Allowing the Facilities Department to control the heat to minimize the heat that is wasted by the current system.

Cost Analysis

<table>
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<th>Year</th>
<th>Cost Per Year ($)</th>
<th>Cost of Just Feb ($)</th>
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<tbody>
<tr>
<td>2015</td>
<td>30713</td>
<td>5418</td>
</tr>
<tr>
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<td>30832</td>
<td>5368</td>
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<td>31140</td>
<td>5487</td>
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<td>2012</td>
<td>29493</td>
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</tbody>
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- The table above outlines the cost of Stoddard B’s electricity usage for the past four years.
- A pilot program of 6 sample rooms using ALS will give an estimate for how much less it would cost to heat the buildings using the ALS system.

Acknowledgements

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References