Energy Saving Opportunities at Cole Field House

Introduction

As the Williams College Athletic Department looks to cut its budget by 2-5%, there have been many suggestions as to which elements of the athletic program the department can forgo (at least for now). Among these suggestions is forbidding teams to travel and train abroad, creating a roster limit, and decreasing the overall number of teams by downsizing the number of Junior Varsity teams. While no decision has been made concerning which suggestion will be supported the most, I would like to explore ways that the athletic department can save money in its everyday practices in order to avoid dramatic changes in the program. The key to this endeavor is exploring solutions whose implementation can be traced back to the Athletic Department. Thus, I will focus my research on Cole Field House, a specific athletic facility whose energy output can be easily monitored.

Why Cole Field House?

From September to December Cole Field house is used daily by football and soccer teams (men’s and women’s and varsity and junior varsity). After spring break it is reopened for the use of women’s softball and men’s baseball. This means that in the fall alone, approximately 155 athletes use Cole regularly for almost four months. And while approximately 40 athletes use the facility in the spring, efficient use of it is no less important.
Moreover, Cole does not simply provide athletes with a place to change before and after practices and games. We shower after each practice and game; two sets of practice and game uniforms are washed on the first floor by Glenn Boyer; we use stem machines, whirlpools and other medical devices to heal ailments; and we make use of lights and heat, especially as winter approaches and the sun sets earlier. Indeed, Cole Field House is a multi-purpose athletic facility with promising opportunities for huge savings.

**Cole Field House – a closer look**

Cole Field House was first established in 1926. It has 16,099 square feet and faces south, though it is perhaps located at one of the most northern parts of campus. Since 1926 it has been renovated twice, once in 1986 for $105,000 and most recently in 1997 for $1,727,923.

Despite only two complete renovations, the building has received many improvements throughout the years. For example, washing machines were added in 1976, showers were renovated in 1994, sewer lines were renovated in 1995, rest rooms were renovated in 1995, and the building received a ventilation upgrade in 2008. During the 1997 renovation the facility received it last boiler update. According to Don Clark, Utilities Program Manager, these cast iron, gas-fire boilers are 81-82% efficient. He estimates that replacing this boiler will cost between $8,000 and $10,000.

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1. Facilities | Property Book | History Of Construction Projects.
2. Interview with Don Clark.
Locating the opportunities for savings

In order to identify opportunities for savings we must know where to look and how to access the information we receive from these places. On a monthly basis Cole Field House incurs costs in the form of electricity, natural gas and water/sewage. And because these monthly totals accumulate, it is perhaps best to look at Cole’s annual energy output totals. For the purpose of this project I will look at the 2008 totals.

Our purpose in analyzing these three areas is to understand what factors influence Cole’s energy output. How often is the building used and by how many people? What is its occupancy schedule? What is its electric, natural gas, and water/sewage use and cost? Are there specific utilities, such as washing and drying machines or poor insulation, which heavily contribute to these totals? After weighing these factors, we must decide if Cole’s 2008 totals are satisfactory and what can be done to reduce them.

Results and Brief Analysis

Cole Field House 2008 Total Energy Output

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Electricity</th>
<th>Natural Gas</th>
<th>Water/Sewage</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh</td>
<td>139,025</td>
<td>12,808</td>
<td>516</td>
</tr>
<tr>
<td>Cost</td>
<td>$20,989</td>
<td>$16,755</td>
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</tr>
<tr>
<td>Cent/kwh</td>
<td>15 cents</td>
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</tbody>
</table>

Notes: kWh – kilowatt-hour; CCF- 100 cubic feet.3

3 Interview with Don Clark.
Electricity

**Figure 1, September 2008 – December 2008**

Figure 1 indicates that Cole’s electricity use increases significantly between October and November, peaking at approximately 18,000 kWh during November. One plausible explanation for this jump is that as winter approaches the weather is colder and the sun sets earlier, requiring more light and heat for the building. Not to mention that athletes may take longer, warmer showers as this change in weather occurs.

**Figure 2, February 2009 – March 2009**

Ironically, when the building is closed to athletes during February and before spring break, it still outputs almost 14,000 kWh. Figure 2 suggests that while
athletes have a direct impact in the amount of electricity produced, there are other factors that contribute significantly to Cole’s energy output.

**Figure 3, June 2008 – August 2008**

![Graph showing electricity use from June 2008 to August 2008.](image)

Figure 3 reaffirms the aforementioned idea. Even when athletes are not using Cole Field House on a regular basis during the summer months, it outputs an average of 10,000 kWh.

**Natural Gas**

**Figure 4, January 2008 – January 2009**

![Graph showing natural gas use from January 2008 to January 2009.](image)
Figure 4 indicates that Cole Field House uses more natural gas during the spring than any other time of the year, peaking at about 3,000 CCFs. One would assume that as spring approaches the weather gets warmer and thus the building would require less heat. Moreover, a much smaller percentage of athletes use the facility in the spring yet its natural gas usage exceeds the amount used in the fall.

**Discussion of factors impacting energy output and recommendations**

**Electricity - Impact of Athletes**

Figure 1 indicates that athletes have a direct impact on the amount of electricity used at Cole Field House. From September to November the kWh's increase by approximately 5,200 kWh as it jumps from 12,800 kWh to 18,000 kWh.

**Recommendations**

What can athletes do to decrease their amount of electricity consumption? One solution is as simple as turning off the lights. Each locker room has several light switches, one to control lighting in the dressing area, another to control lighting in the restroom area and a final switch to control lights in the communal shower area. Athletes usually leave the locker room and head down to their respective practice fields individually. That is, the entire team does not leave as a group, which means that the last person who leaves the locker room is essentially responsible for turning off all of the lights.

Additionally, most teams have electrical devices that remained plugged in an outlet regardless of whether the device is being used. Each team has some form of stereo system in its locker room. Unplugging these devices when they are not in use could also decrease electricity consumption.
However, given that Cole still outputs 10,000 kWh during the summer when it is not in use by athletes, there must be other devices and/or utilities in the building that heavily contribute to its electricity output.

Electricity - Impact of Exhaust Fans

According to Don Clark, Utilities Program Manager, and Ken Jensen, Mechanical Maintenance Supervisor, the exhaust fans in Cole Field House operate twenty-four hours a day for seven days a week when the building is in use, contributing significantly to its electricity output. Because Cole Field House is not air conditioned, there must be a mechanically ventilated system by means of exhaust fans in order to effectively circulate the air. Health and safety regulations require locker rooms in particular to have adequate ventilation in order to prevent staph skin infections including MRSA, a strain of staph that is highly resistant to many antibiotics. The contagious toxins that produce MRSA flourish in humid conditions such as those found in locker rooms. It is a kind of bacterial parasite that enters the body through small cuts. Improperly ventilated locker rooms are conducive to MRSA because they possess damp athletic equipment and athletes with cuts that use this equipment. Cole Field House received a ventilation upgrade in 2008 in response to a MRSA outbreak in 2007.

Recommendations

Indeed, proper ventilation is necessary in locker rooms in order to limit humidity and thus decrease the opportunity for staph infections to breed. However, when Cole does not house athletes with open wounds and damp athletic equipment,

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4 105 CMR: Department of Public Health: 28.
5 Davis, 2009: 1.
the building's locker rooms are much less likely to produce the bacteria responsible for staph infections.

In the summer months Cole Field House is used occasionally to host football and soccer clinics that usually last a week or so. Because this use is minimal, however, the summer is an optimal time to turn off the exhaust fans in the afternoon until the following morning. The building is coolest at night and does not store damp athletic equipment during the summer. Ken Jensen indicated that members of the college's administration have already met to discuss this option, proposing that the exhaust fans be turned off from 4 pm to 6 am. Mr. Jensen and others are currently assessing the health risks associated with turning off the fans during these hours.

Although Cole is at low risk of breeding staph infections during the summer, other simple measures can be taken in order to allow the exhaust fans to be turned off at night. In particular, assuming that all windows in the building have screens, these windows could be opened twenty-four hours a day in order to increase natural airflow. Moreover, when the exhaust fans are turned off at night, regular fans could be placed in areas of the building that are deemed high-risk areas for bacteria.

Natural Gas - Impact of Inefficient Boiler and Poor Insulation

Figure 4 suggests that when Cole Field House is in use during the fall and spring seasons, it burns a significant amount of natural gas. However, when these seasons are over and athletes are no longer using the building on a regular basis, the natural gas output drops rapidly and levels around 0 CCFs.
Natural gas is used for space heating, water heating, cooling, and drying, with space and water heating usually accounting for the most of the natural gas consumption. Given this knowledge, it makes sense that as soon as athletes use Cole regularly its natural gas usage increases both rapidly and significantly. Hot water is needed for showers, for washing and drying the practice and game uniforms of each athlete and for heating the building. But how efficiently are these tasks being completed?

While the building must be heated in colder months, it is rather surprising to see Cole’s natural gas output peak at approximately 3,000 CCFs during April. There are considerably fewer athletes using the building in the spring and the weather tends to get warmer. Additionally, fewer athletes mean fewer uniforms to wash and fewer individuals in a building requiring heat.

Recommendations

According to Don Clark, Cole’s last boiler upgrade was in 1997 and that these boilers were only 81-82% efficient. He expressed reluctance in replacing these boilers because to do so would cost somewhere between $8,000 and $10,000. Given the amount of natural gas that Cole seems to output unnecessarily, however, replacing these boilers seems like a worthwhile investment.

Furthermore, the college could improve the building’s insulation by assessing the cost of replacing its windows. Unlike upgrades in some parts of the building, the windows have been somewhat neglected in terms of realigning them to ensure that they close properly.
Conclusion

As Cole Field House looks to decrease the amount of cost it incurs in the form of electricity, natural gas, and water/sewage, it should consider more efficient means of using its exhaust fans, replacing an outdated and inefficient boiler, realigning windows, and encouraging athletes to take responsibility for their contribution to these costs.

Even without replacing existing utilities in Cole Field House, there are steps that the building can take to decrease its electricity output. And while replacing its boiler requires an investment by the college, such an investment has a worthwhile payback in terms of efficiency and savings.

Rather than accepting budget cuts in the Athletic Department, each athletic facility, such as Cole Field House, Chandler Gym, Lansing Chapman Rink, and the Muir-Samuelson Pool, could propose to decrease the amount of cost it incurs annually. The savings from these improvements, which would be measured by comparing annual energy outputs, could be returned to the Athletic Department so that it may continue its regular practices.
Works Cited


"Interview with Don Clark." Personal interview. 22 Apr. 2009.