

---

# 2009 IU Energy Challenge



Office of Sustainability

Mckenzie Beverage

July 2009

Mentor: Mike Steinhoff

---

## I. Executive Summary:

The 2009 IU Energy Challenge is the second energy and water conservation competition at Indiana University. The challenge began March 25, 2009 and ended on Earth Day, April 22, 2009. The 2008 competition included 10 out of the 11 dorms\* on the IU Bloomington campus, but the 2009 competition included the dorms from last year's competition plus 18 Greek houses.\*\* The winners: Sigma Alpha Mu for the Greek houses and Teter Quad for the dorms. The dorm prize included a \$4500 contribution for the installation of a high-visibility energy conservation project (yet to be determined) and a cookout. Sigma Alpha Mu was awarded a \$900 cash prize.

The purpose of the four-week-long challenge is to educate students about the effects that simple behavioral adjustments can have on conserving energy and water. The Energy Challenge gives students the chance to actualize the immense monetary savings but, more importantly, the positive impact on the environment through reductions in carbon dioxide emissions.

According to the USGBC, buildings alone account for seventy percent of electricity consumption in the United States and thirty eight percent of this country's carbon dioxide emissions, exceeding both the transportation and industrial sectors.<sup>1</sup> Construction of energy efficient buildings is on the rise; however, in order to operate optimally, inhabitants must be educated about the impact of their behavior on the building's performance and consumption.

The Energy Challenge is an educational endeavor that attempts to make students at Indiana University more aware of their impact through experiential learning that produces immediate results. The four-week challenge is long enough to provide quantifiable results yet short enough to keep students engrossed in the activity.

Increased outreach efforts heightened awareness of this year's challenge. The 2009 Energy Challenge's savings increased 59 percent for electricity and 83 percent for water over last year's challenge. Savings are based on a baseline of average usage of the same four weeks from the years 2005, 2006 and 2007. These baseline figures were used for the 2009 Challenge to measure the improvements from last year.

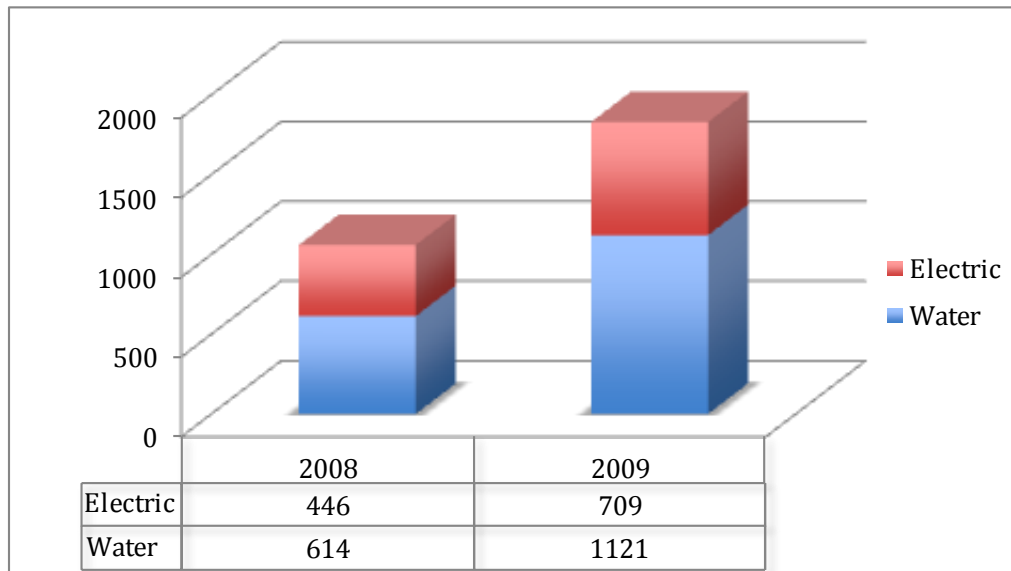
Image 1 is a bar graph depicting the amount of water and electricity saved in thousands of kWh or gallons of water from 2008 to 2009.

---

\* Participating Dorms: Ashton, Briscoe, Eigenmann, Forest, Foster, McNutt, Teter, Read, Willkie and Wright. These dorms are automatically entered into the challenge as participants. Collins was the only dorm that could not participate because the building does not have electric meters and their savings cannot be measured.

\*\* Participating Greek Houses: Sigma Alpha Mu, Phi Mu, Kappa Alpha Theta, Delta Gamma, Alpha Epsilon Phi, Delta Zeta, Alpha Chi Omega, Zeta Tau Alpha, Phi Delta Theta, Alpha Phi, Alpha Xi Delta, Kappa Kappa Gamma, Chi Omega, Sigma Chi, Gamma Phi Beta, Sigma Pi, Theta Chi and Delta Upsilon. In order to participate, Greek Houses had to opt into the Challenge and pay a \$50 fee.

Image 1



In 2009, the ten residence halls saved a combined total of 709,211 kilowatts of electricity and 1,120,813 gallons of water. The participating Greek houses had a combined savings of 30,975 kilowatts of electricity and 509,475 gallons of water. These efforts translate to an estimated cost savings of \$47,000 for the month of the challenge!

In total, the dorms' and Greek houses' savings averted 1,151,729 pounds of carbon dioxide emissions, a greenhouse gas that contributes to climate change. While the 2008 Challenge resulted in an avoided 801,454 pounds of emissions. Together these two challenges saved 1,953,183 pounds of emissions. This is an incredible figure especially considering the brief time frame of the challenges.

Looking at the big picture, these efforts may seem insignificant. According to the Department of Energy, 16 million tons of carbon dioxide are emitted into the earth's atmosphere every 24 hours.<sup>2</sup> Nonetheless, a mere 10,000 thousand students were able to save nearly two million pounds of carbon monoxide over the course of the 2008 and 2009 Energy Challenges. The latter challenge reached an even higher success through additional campus outreach efforts. With continued diligence, these savings will continue to rise.

## II. History:

The 2008 Energy Challenge developed out of an Informatics Masters capstone project. David Roedl, a student in Human Computer Interaction Design in the School of Informatics, developed an interactive website similar to Oberlin College's Resource Monitoring System to showcase each dorm's consumption.<sup>\*\*\*</sup> The website, [energychallenge.indiana.edu](http://energychallenge.indiana.edu), allows

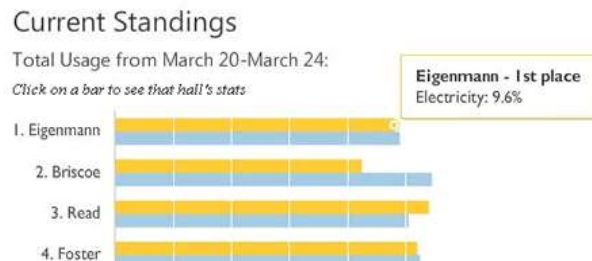
\*\*\* See Oberlin's Dashboard: <http://www.oberlin.edu/dormenergy/>

users to see how much energy and water their dorm or Greek house is consuming compared to their competitors.

Roedl's website was the catalyst for the Energy Challenge that lasted from March 20 – April 17, 2008. The Greek houses did not participate in the first competition. Overall, the 10 participating dorms saved 446,139 kWh of electricity and 613,919 gallons of water compared to their three year baseline. These conservation efforts attributed to an estimated cost savings of \$26,000.

Image 2 is a snapshot of the standings bar graph from the website.

*Image 2*



The interactive website displays the rankings of each participating dormitory building and Greek house. The amount of water and electricity is displayed as a percentage of the one-month baseline.<sup>3</sup> In addition to displaying standings, the website offers tips for conservation and useful links such as ecological footprint calculators and phantom load charts. The official rules of the challenge are also displayed.

This Masters Capstone Project secured David Roedl a spot at the 2008 Microsoft Imagine Cup Interface Design Competition in Paris, France. The competition allots 24 hours for contestants to work through a website design problem and prepare a presentation. Although Roedl and his teammate, Will Odom, were late due to a delayed flight, they won first place.<sup>4</sup>

### III. Methods

The Energy Challenge is hosted by the Office of Sustainability, formerly known as the Task Force on Campus Sustainability. Other collaborators include the Residence Halls Association, Residential Programs and Services, Physical Plant Utilities, Duke Energy, City of Bloomington Utilities, Greeks Go Green, Sustainable Interaction Design Research Group and Volunteers in Sustainability. These collaborators aided in everything from collecting and analyzing consumption data, informing and educating students about the challenge and conservation measures, organizing outreach efforts and planning events.

The 2009 Energy Challenge was made financially possible by Indiana Memorial Union, IUB Libraries, the Office of the Provost, the Office of the Vice President, Residential Programs and Services, Physical Plant Utilities and TRANE Corporation. These contributors printed posters, posted information on their websites and financed the dorm prize. The Greek houses contributed \$50 per house to raise the funds for their prize. Greeks Go Green officiated the fundraising for the Greek houses and managed the funds until the end of the challenge.

**1. Data Collection and Analysis**

Glenn Moulton from the IU Physical Plant Utilities was the sole meter reader for the 2008 and 2009 Energy Challenges. During the challenge, the dorm meters were read semi-weekly and the Greek house meters were read once weekly. The readings were then entered into a spreadsheet to determine usage based on their three-year average consumption rates.

Each baseline is calculated on the individual buildings' usage. The building in turn competes for the greatest reduction against its own baseline. The baselines for the dorms were determined during the 2008 challenge from information in the Physical Plant electric and water consumption archives from 2005, 2006 and 2007. The Greek houses are not metered by IU Physical Plant so their consumption archives had to be retrieved from Duke Energy and the City of Bloomington to determine their three year baseline.

Image 3 is a snapshot of the spreadsheet for the dorms from the last reading of the '09 Energy Challenge:

*Image 3*

	TOTAL SINCE 3/25			PER	CAPITA	BASELINE	BASELINE	%	%	100%	RANK
	WATER	ELECTRIC	RESIDENTS	WATER	ELECTRIC	WATER	ELECTRIC	WATER	ELECTRIC		
<b>ASHTON</b>	653,000	136,531	621	1051.53	219.86	698,582	172,917	93.5%	79.0%	86.2%	<b>5</b>
<b>BRISCOE</b>	1,707,500	153,240	969	1762.13	158.14	1,602,154	235,176	106.6%	65.2%	85.9%	<b>3</b>
<b>EIGENMANN</b>	1,320,000	402,812	670	1970.15	601.21	1,184,098	565,601	111.5%	71.2%	91.3%	<b>9</b>
<b>FOREST</b>	1,430,000	195,000	897	1594.20	217.39	1,273,274	236,288	112.3%	82.5%	97.4%	<b>10</b>
<b>FOSTER</b>	1,340,000	272,330	1111	1206.12	245.12	1,396,560	348,954	96.0%	78.0%	87.0%	<b>6</b>
<b>MC NUTT</b>	1,707,500	324,800	1287	1326.73	252.37	2,127,939	382,599	80.2%	84.9%	82.6%	<b>2</b>
<b>READ</b>	1,680,000	328,464	933	1800.64	352.05	1,835,491	389,033	91.5%	84.4%	88.0%	<b>7</b>
<b>TETER</b>	1,166,000	69,556	1118	1042.93	62.21	1,383,313	213,773	84.3%	32.5%	58.4%	<b>1</b>
<b>WILLKIE</b>	1,187,400	227,524	721	1646.88	315.57	1,609,431	220,244	73.8%	103.3%	88.5%	<b>8</b>
<b>WRIGHT</b>	1,570,000	279,480	965	1626.94	289.62	1,771,373	334,363	88.6%	83.6%	86.1%	<b>4</b>

The 'Total Since 3/25' columns list the total usage in kWh and gallons of water consumed since the beginning of the Energy Challenge on March 25, 2009. The 'Total Since 3/25' is divided by the number of residents to come up with the 'Per Capita' numbers. The 'Baseline' columns are the average consumption numbers from 2005, 2006 and 2007 for each individual dorm.

Throughout the challenge these numbers will adjust based on the percentage of time passed in the challenge. For example, if the challenge is three-quarters of the way through, Ashton's water baseline number will be 548,885. Image 3 is the last reading of the challenge so the baseline numbers are the three-year averages, 100 percent of the way through the challenge.

The percentage columns are the numbers that determine a building's ranking. These numbers are determined by taking the 'Total Since 3/25' and dividing that number by the 'Baseline' number. The water and electric percentages are then averaged and the building with the lowest percentage is awarded the first place position.

## ***2. Awareness and Outreach***

The success of the Energy Challenge is dependent on student awareness about conservation measures and about the challenge itself. Reaching nearly 10,000 students is an endeavor that requires much planning and many different forms of outreach. At least 4-6 months should be allotted for the planning phase. This gives all parties involved enough time to coordinate the many avenues of outreach.

Although the dorms and the Greek houses participated in the Energy Challenge, outreach efforts vary greatly between them. The next two sections will be divided accordingly.

### ***Dorm Outreach***

#### ***i. Staff/Management/Resident Assistant Outreach***

It is mandatory to the success of the Energy Challenge to meet with dorm managers, RAs, floor presidents, student government (RHA), and other key members of RPS on a regular basis. These groups serve as a proxy to communicate with the students. Attending big staff meetings in the dorms is the best way to communicate with these groups and make sure they are all on the same page.

#### ***ii. Student Outreach***

Student involvement is a helpful tool for spreading awareness. Students communicate with their peers more readily than they see a flyer on a bulletin or notice an article in the student newspaper. Attempts were made this year to recruit students from every floor of each dorm to serve as Eco-Reps, but there was not a high volume of response. The intent of having Eco-Reps is to have students 'on the ground' that will communicate between the coordinator and their peers regularly. This alleviates the pressure from the RAs and RPS staff to communicate everything from The Office of Sustainability to the students.

### iii. Poster and Flyer Advertisements

The Office of Sustainability printed one large poster for each dorm lobby. The poster was designed by David Roedl for the 2008 challenge and can be seen on the title page of this document. Flyers were also printed for the bulletin boards on every dorm floor. Image 4 is a copy of the flyer that was posted on the bulletins:

Image 4



### iv. Email Blasts

Emails are an effective and more sustainable way to communicate with students than printing flyers and posters. Information about the Energy Challenge was included in the weekly *InTouch* emails that are sent to every student living in the dorms. Emails were also sent to RAs and dorm managers to be forwarded to students, however it was unclear whether the emails were being forwarded to the students because there was no feedback mechanism set in place. Additionally, it is unclear how many students read their emails therefore this form of communication cannot be relied heavily upon.

#### *v. Dorm information screens*

Every dorm lobby has at least one flat screen monitor that displays relevant information about the dorm, activities on campus, student resources, etc. These screens displayed a digital image of the Energy Challenge poster before and during the competition.

### ***Greek House Outreach***

Communication with the Greek house participants is a much less complicated process because there are fewer people and systems already in place to communicate with an entire house. Greeks Go Green, an organization within the Greek community dedicated to reducing IU and the Greek community's carbon footprint, was the main liaison between the Office of Sustainability and the Greek community.

#### *i. Semi-monthly meetings*

Over the course of the spring semester, Greeks Go Green held weekly meetings for the Executive Board and semi-monthly meetings for the mass members. As stipulated in the rules for the Greek Energy Challenge, each house was required to have an Eco-Rep that attended these meetings. At the meetings information about conservation measures, events related to the Energy Challenge and other sustainability related issues were discussed.

#### *ii. Email blasts*

Emails with information about meetings, Energy Challenge standings updates and general reminders were sent out regular to the Eco-Reps who forwarded the emails to other members of their household.

#### *iii. Greek This Week*

*Greek This Week* is a newspaper publication devoted to the Greek Community. Two articles were written about the Energy Challenge; an informative article with information about the website, the rules and the previous challenge and a critical opinion piece. The opinion piece claimed that an anti-group was formed titled 'Greeks Don't Care.' This group never gained much clout and seemed to unify the participants further after the article was written.

### ***Utilizing Available Media***

It is difficult to predict which media form will have the biggest impact on its target audience. Although there are many forms of media to choose from, it is vital to the success of the Energy Challenge to keep students informed of their dorm or Greek house's standing to foster competition.

#### *i. Web 2.0*

The Energy Challenge website received semi-weekly updates. To keep students more engaged, the Energy Challenge also posted the updates on Twitter and Facebook during the

2009 Challenge.\*\*\* Energy Challenge related events, standings, pictures, personal experiences, etc. were the main content for the Energy Challenge Facebook Fan Page. The Energy Challenge Twitter account only posted standing updates.

#### *ii. IUSTV*

IU Student Television is a student-run broadcasting network that airs in the dorms and other buildings on campus. IUSTV ran a story about the Energy Challenge.\*\*\*\* Additionally, IUSTV interviewed me and broadcast the live interview.\*\*\*\*\*

#### *iii. Print media*

The *Herald Times* and the *Indiana Daily Student* are the two local newspapers in Bloomington. The Energy Challenge was featured in the *Herald Times* two times: Friday, March 27, 2009 in the *Down to Earth* section and Thursday April 23, 2009 on the front page. The IDS also featured the Energy Challenge two times: Wednesday, March 25, 2009, the first day of the competition and Thursday, April 23, 2009 on the front page. Coverage in the newspaper contributed to awareness in the student body outside of the competition participants as well as awareness among Bloomington residents.

#### *iv. YouTube*

Leila Marsh, an IU Telecommunications student, filmed, directed and produced an eight and a half minute documentary for her final project.\*\*\*\*\* This documentary interviews the 'behind-the-scenes' people that make the Energy Challenge possible. The documentary also provides a thorough description of the challenge, how it works and tips for conserving water in electricity in the dorms and Greek houses. The video was posted on YouTube for public viewing.

#### *v. Press Releases*

Finally, press releases are the gateway to outside media outlets. A press release was written at the beginning, middle and end of the Energy Challenge. All press releases can be found on the IU News Room website or via the links below.\*\*\*\*\*

---

\*\*\* Visit the Twitter Page: <http://twitter.com/iuenergychallenge>; Visit the Facebook Page: [http://www.facebook.com/pages/2009-IU-Energy-Challenge/58400571327?v=box\\_3&viewas=0#/pages/2009-IU-Energy-Challenge/58400571327](http://www.facebook.com/pages/2009-IU-Energy-Challenge/58400571327?v=box_3&viewas=0#/pages/2009-IU-Energy-Challenge/58400571327)

\*\*\*\* IUSTV, Residence Halls Go Green, <http://www.iustv.com/news/headlines/story.php?story=128>

\*\*\*\*\* IUSTV, <http://www.youtube.com/watch?v=4Pg3D0qE52k>

\*\*\*\*\* Leila Marsh, 2009 IU Energy Challenge Documentary, <http://www.youtube.com/watch?v=t6k63KOTba8>.

\*\*\*\*\* IU News Room: <http://newsinfo.iu.edu/news/page/normal/10324.html>;  
<http://newsinfo.iu.edu/news/page/normal/10600.html>; <http://newsinfo.iu.edu/news/page/normal/10692.html>

## IV. Recommendations

The largest improvement between the 2008 competition was the incorporation of an academic year intern for the Energy Challenge. My job as the coordinator consisted of hugely varied duties that were also very time consuming. My main recommendation for next year's competition is to assign the internship to two people with a mentor that has time to provide constant guidance. This will allow the intern to personally conduct more outreach in the dorms and make more contact with the students.

Additionally, I strongly recommend the creation of Energy Challenge committees in the Office of Sustainability and in RPS. The committee positions should be appointed in the Office of Sustainability. The RPS committee should consist of at least three dorm managers and the leader of the committee should be the previous year's winner. I also recommend RAs and several appointed or elected students, or Eco-Reps, from every dorm join this committee. Meetings between these two committees should be held regularly and with more frequency closer to the Challenge. With guidance from the mentor, the coordinator should hold the decision making power.

One very helpful tool for the Energy Challenge would be a survey for every student involved. The survey should address the student's level of awareness about the competition, their level of interest and what the student has learned. Paper surveys should be handed out to every student and collected accordingly. Although paper is not the most sustainable option, it is the most reliable.

Over the course of the Energy Challenge there were several things suggested to me. First, the timeline of the Energy Challenge may need to be reconfigured. Currently the Energy Challenge falls around the Little 500 race, one of the most celebrated events on the IU Bloomington campus. Additionally, the Energy Challenge takes place at the end of the year, which does not give students time to implement what they learned. It was also suggested that the Energy Challenge timeline is extended to last a semester or the academic year. However, I believe that the Energy Challenge timeline is appropriate because over time students would lose interest and the lesson would be lost.

An additional suggestion was to form a campus-wide Energy Challenge against another university in Indiana. Purdue is the obvious choice. This is a great idea and hopefully it will happen someday but a lot of research, preparation and coordination is required for such an endeavor and it will probably take several years to make that competition happen.

## V. Concluding Remarks

The Energy Challenge is powerful educational tool that is filled with potential. I am so impressed with the enthusiasm and vigor so many students showed over something as simple as turning off faucets and flipping the lights off. The team at the Office of Sustainability has done a remarkable job putting this competition together. Coordinating

this competition was one of the most rewarding experiences I've ever had because I know that these students have made a difference and they are excited about it. The most encouraging thing to me is knowing that we are educating students that simple changes in behavior can make a huge impact; and that is only first step. I cannot wait to see how the competition evolves in the years to come.

## VI. Special Thanks

The Energy Challenge is overall a collaborative effort. The people mentioned below went above and beyond the call of duty to help make the 2009 Energy Challenge happen:

- My mentor and friend, Mike Steinhoff
- The Office of Sustainability: Bill Brown, Michael Hamburger, Emilie Rex, the Interns
- Greeks Go Green: Lucy Wehking and Executive Board
- IU Physical Plant: Lee Walters, Glenn Moulton, Charlie Matson
- RPS: Steve Akers, Bob Weith, Kevin Pozzi, RAs, dorm managers
- IU School of Informatics: Jingyu Wu, webmaster
- RHA: Aarthi Devanathan
- Telecommunications Department: Leila Marsh
- Donors: Provost Karen Hanson, Vice President Terry Clapacs, RPS Director Pat Connor, Trane Corporation and IU Physical Plant Utilities

---

<sup>1</sup> USGBC, "Building Design Leaders Collaborating on Carbon-Neutral Buildings by 2030," 5/7/2007, <http://www.usgbc.org/News/PressReleaseDetails.aspx?ID=3124>

<sup>2</sup> Solar Energy International, <http://www.solarenergy.org/resources/energyfacts.html>.

<sup>3</sup> James Pierce, "Energy Aware Campus Dwelling: Eco-Visualization and the IU Energy Challenge," <https://www.indiana.edu/~sustain/sustainabilityiu/summerfellows08/>.

<sup>4</sup> David Roedl, Personal Website, <http://www.davidroedl.com/2008/07/12/imagine-cup-finals-recap/>.