

IU Energy Challenge



motivating college students to use less

design project by David Roedl
advised by Eli Blevis



First Annual IU Energy Challenge

March 20 - April 17 2008

4 Weeks
10 Residence Halls
8,940 Students
? lbs CO₂ avoided

Ten dorms will compete to
reduce their water and
electricity consumption

Ashton, Briscoe, Eigenmann, Forest, Foster,
McNutt, Read, Teter, Wilkie, Wright

First Prize

Celebratory End-of-the-year Cookout
\$500

Second Prize

\$250

<http://energychallenge.indiana.edu>







Background

Design & Implementation

Results & Criticism

Insights & New Concepts

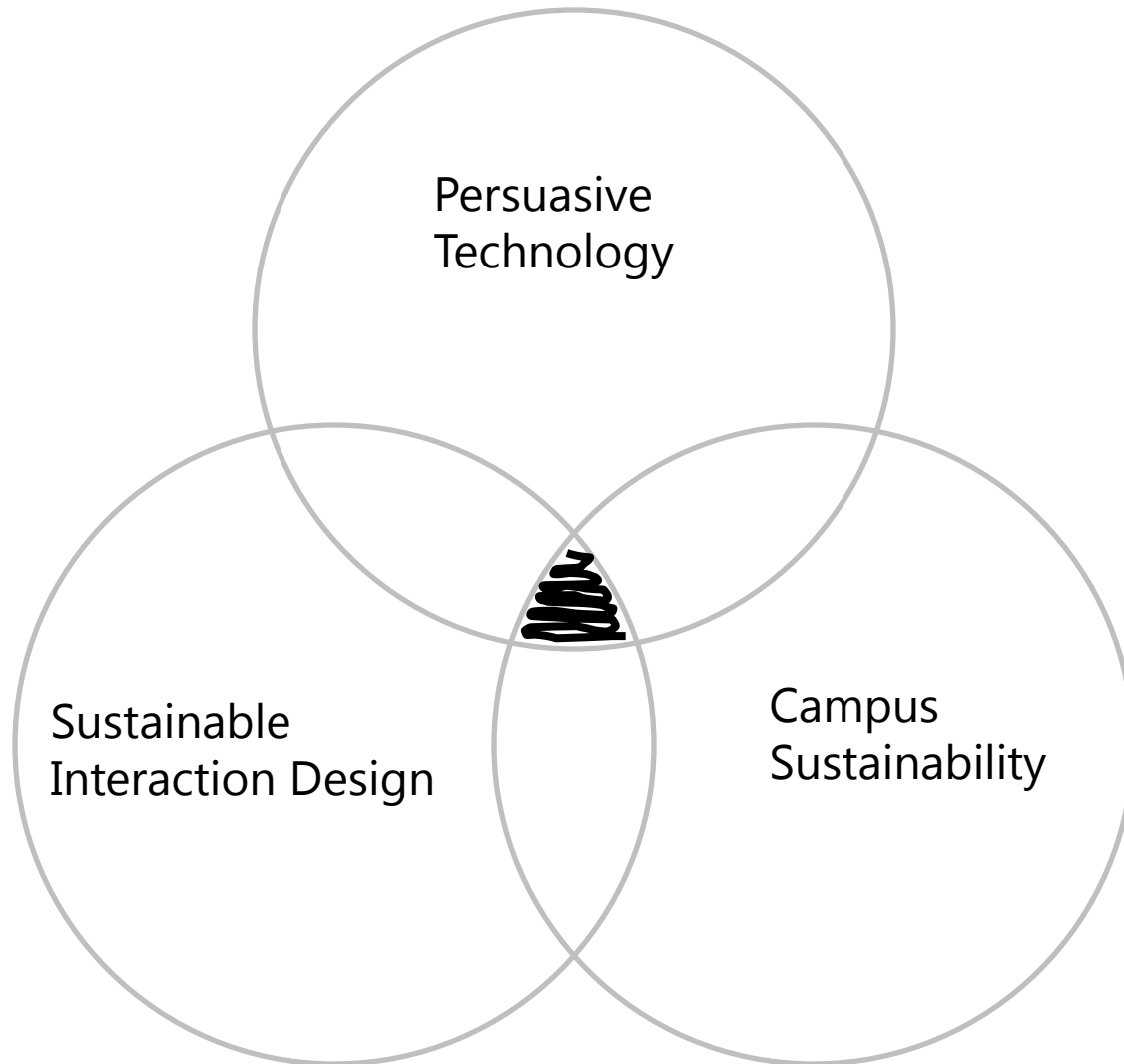
Background

Design & Implementation

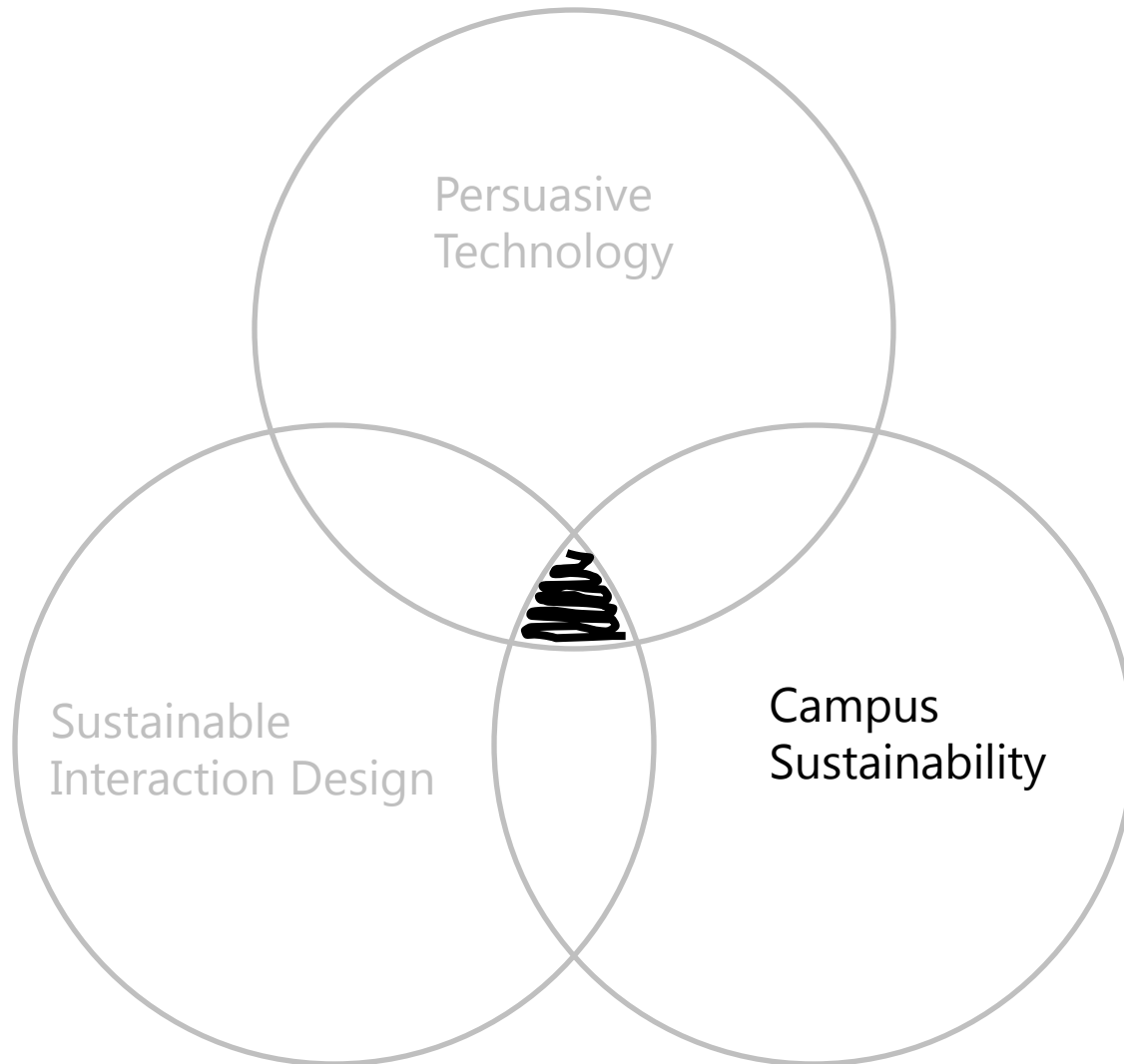
Results & Criticism

Insights & New Concepts

Intersection of 3 themes



Intersection of 3 themes



Co₂nsequences

www.oxfam.org.uk/climatechange



UNION ST

FedEx

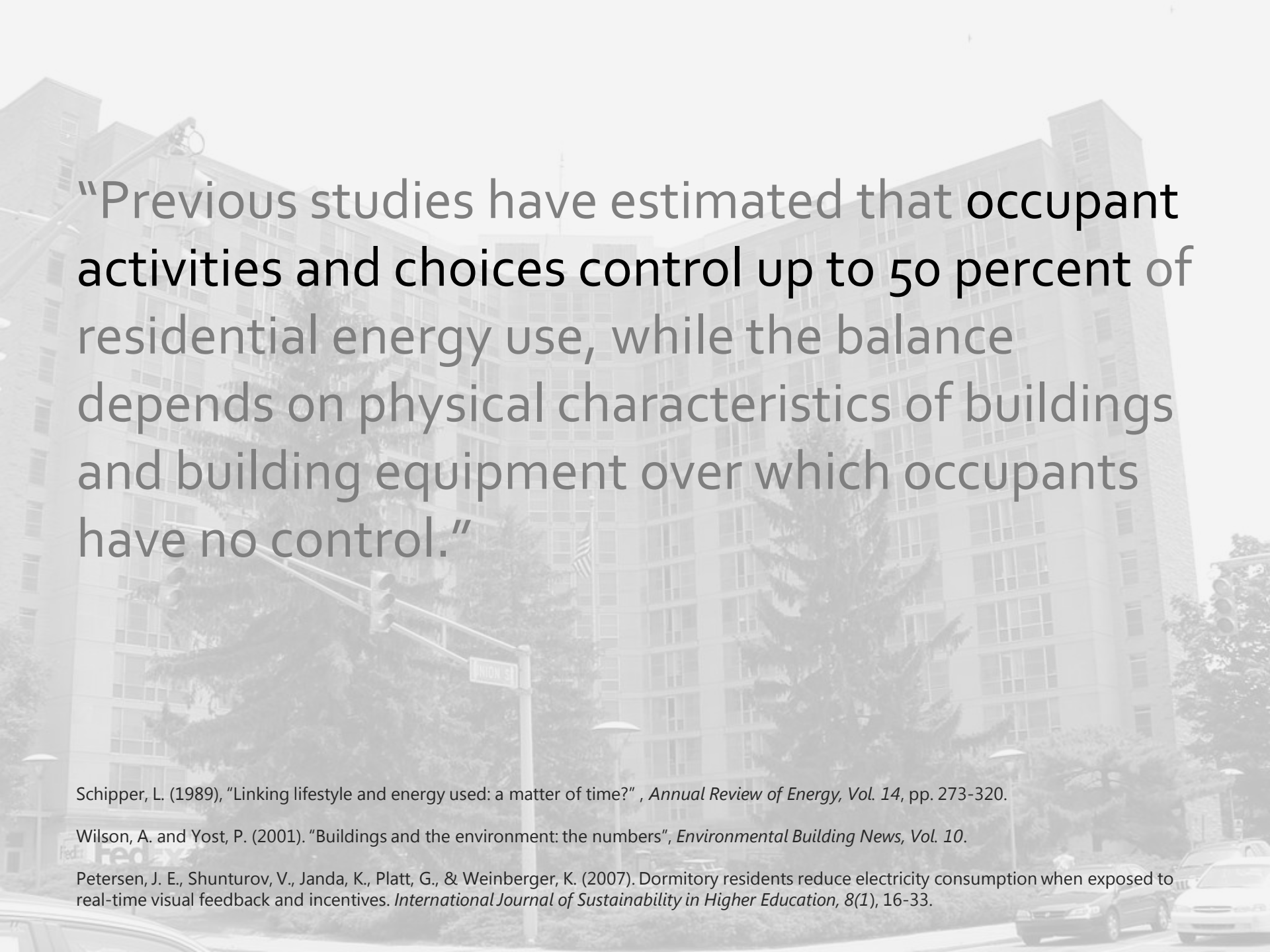


“Residential and commercial buildings account for two-thirds of the electricity used in the US, 36 percent of US greenhouse gasses, 9 percent of world greenhouse emissions, and 12 percent of US fresh water consumption.”

Schipper, L. (1989), “Linking lifestyle and energy used: a matter of time?” , *Annual Review of Energy*, Vol. 14, pp. 273-320.

Wilson, A. and Yost, P. (2001). “Buildings and the environment: the numbers”, *Environmental Building News*, Vol. 10.

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), 16-33.



“Previous studies have estimated that occupant activities and choices control up to 50 percent of residential energy use, while the balance depends on physical characteristics of buildings and building equipment over which occupants have no control.”

Schipper, L. (1989), “Linking lifestyle and energy used: a matter of time?” , *Annual Review of Energy*, Vol. 14, pp. 273-320.

Wilson, A. and Yost, P. (2001). “Buildings and the environment: the numbers”, *Environmental Building News*, Vol. 10.

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), 16-33.

The Indiana University Task Force On Campus Sustainability



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About The Sustainability Task Force



The mission of the Indiana University Task Force on Campus Sustainability is to develop a framework for Indiana University's plan for sustainability. Specifically, seven areas will be considered- Education & Outreach, Resource Use/Recycling, Energy, Built Environment, Environmental Quality/Land Use, Transportation, Food. [Read More >>](#)

Read the IUB Campus Sustainability Report!

News

Applications for Summer 2008 Sustainability Internships Due April 23, 2008

2008 IU Transportation Survey

IU's first Energy Challenge

Campus Sustainability Report

Events

June 12: Indiana Sustainability Alliance

May 9: Build Green - Affordable Housing Conference

Apr 16 - Apr 22: Earth Week Events at IUB

Mar 20 - Apr 17: IU Energy Challenge 2008

Take Action!



Computers in the business sector waste \$1 billion worth of electricity a year.

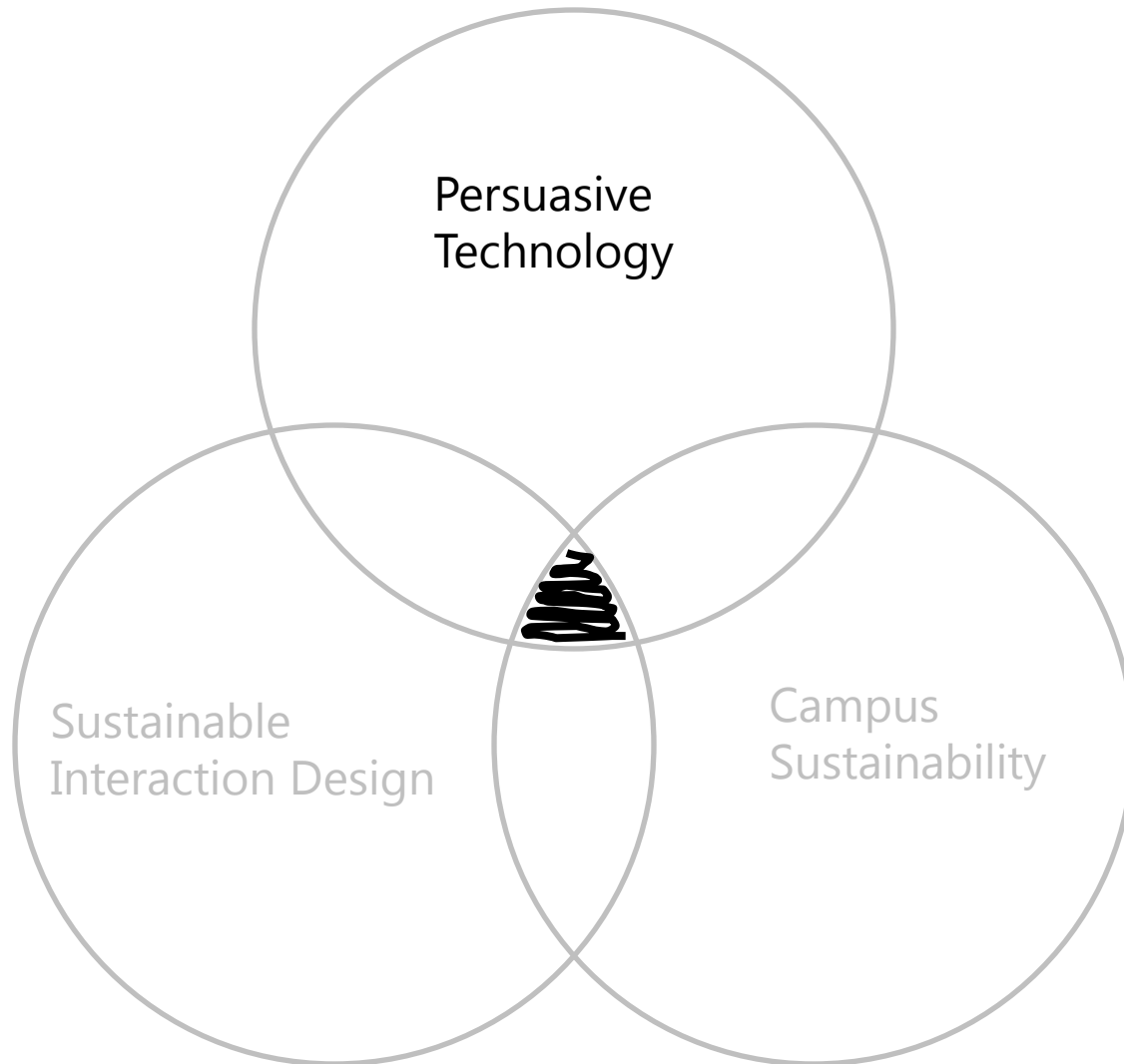
Make it a habit to turn off your computer and the power strip it's plugged into when you leave for the day.

Sustainability Box

Suggestions and comments are welcome. [Click here >>](#)



Intersection of 3 themes



Persuasive Technology

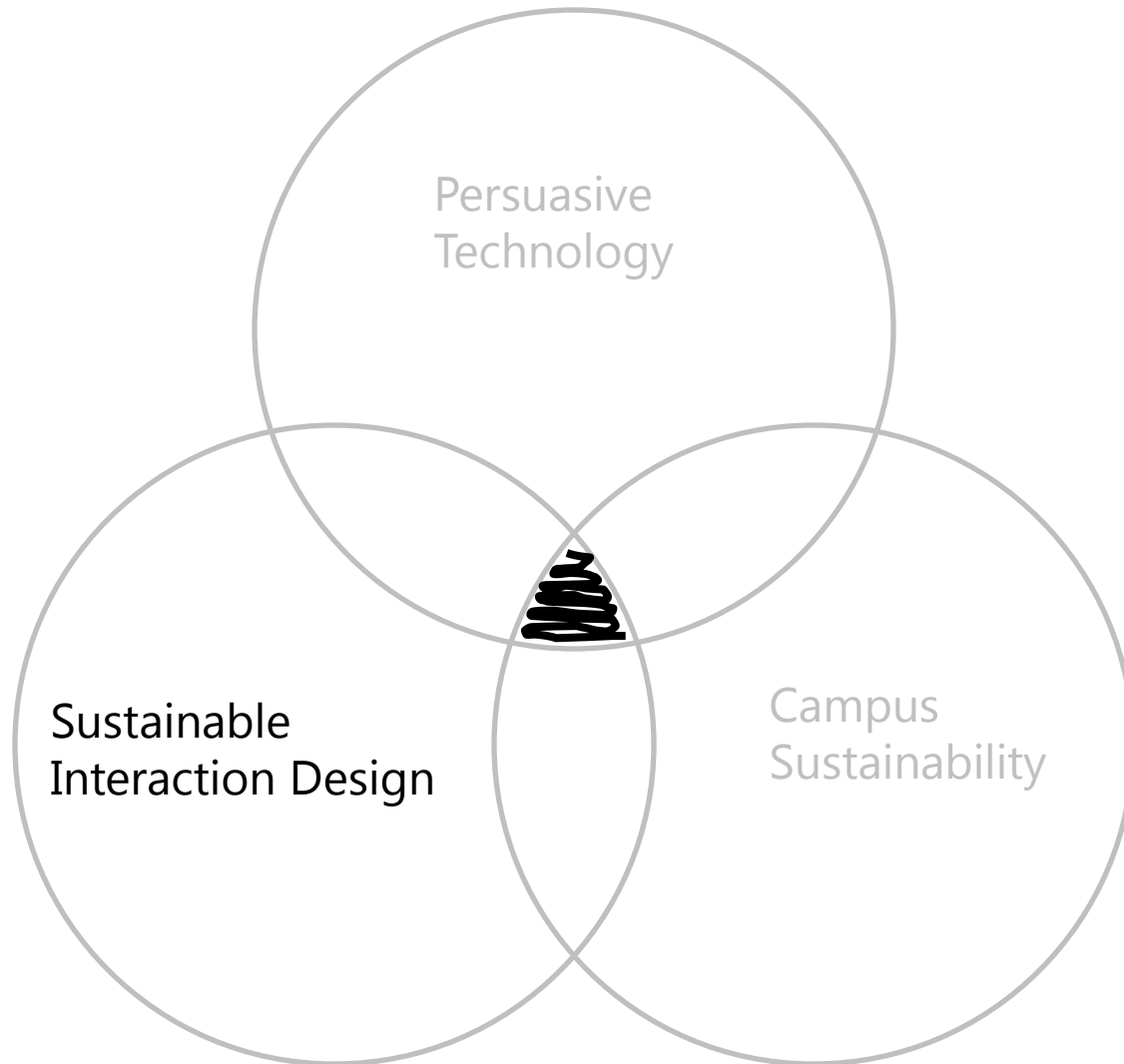
Movement in HCI toward informing choices people make in their everyday lives to motivate positive behavioral or social change.

Consolvo et. al, (2008). Activity Sensing in the Wild: A Field Trial of UbiFit Garden. In *Proceedings of CHI 2008 Conference on Human Factors in Computer*.

Fogg, B. J. (2003). *Persuasive Technology: Using Computers to Change What We Think and Do*. Morgan Kaufmann.

Friedman, B., Kahn, P., and Borning, A. (2006). Value sensitive design and information systems. In P. Zhang & D. Galletta (eds.), *Human-Computer Interaction and Management Information Systems: Foundations*. M.E Sharpe, New York, 348-372.

Intersection of 3 themes



Sustainable Interaction Design

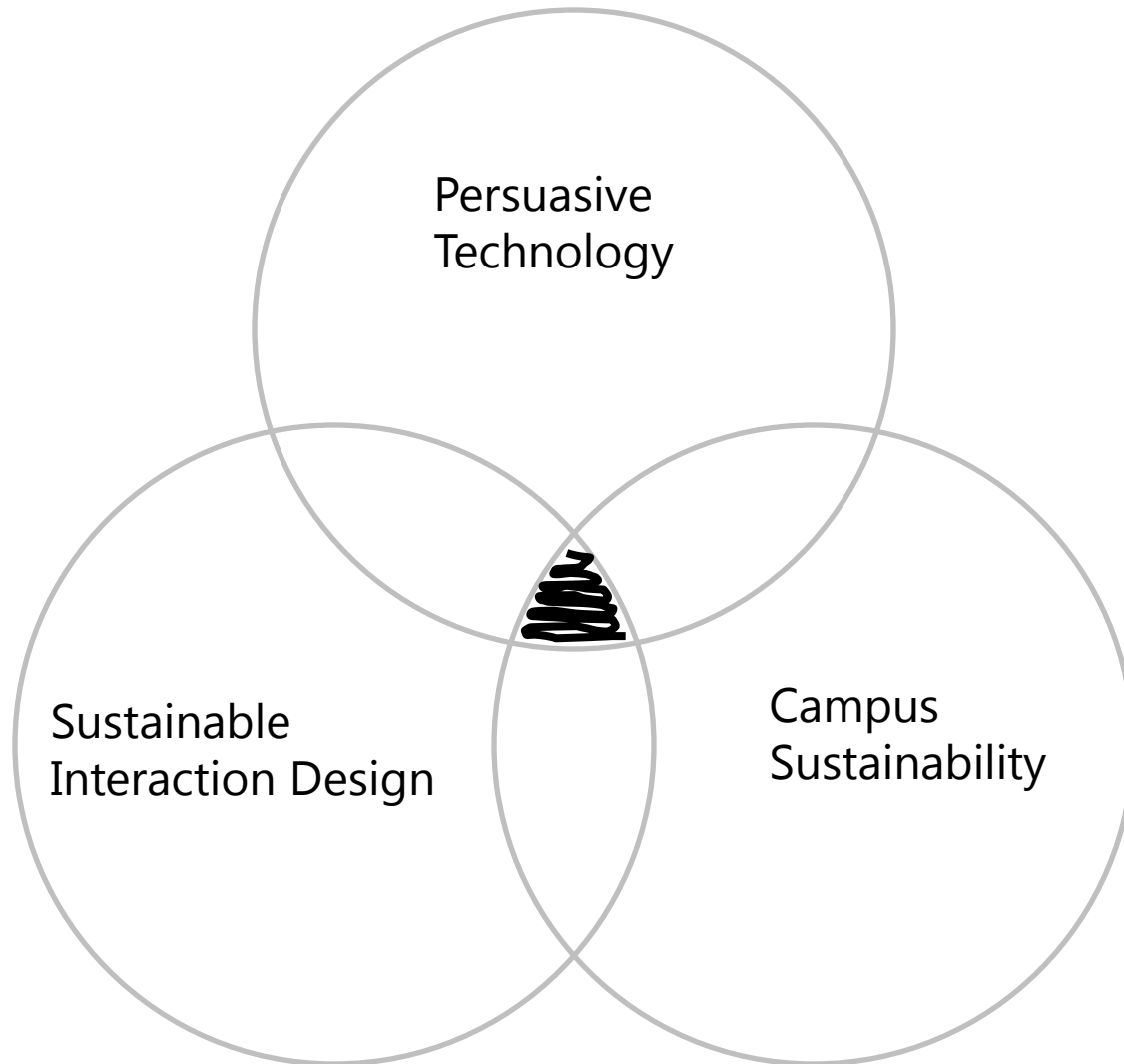
A key emerging area of interest centers on the role that interactive technology can and should play in facilitating more environmentally sustainable behaviors.

Blevis, E. (2007). Sustainable interaction design: invention & disposal, renewal & reuse. In *Proceedings CHI '07*. ACM Press, New York, NY, 503-512.

Holmes, T. G. (2007). Eco-visualization: combining art and technology to reduce energy consumption. In *Proceedings of the 6th ACM SIGCHI Conference on Creativity & Cognition*. p. 153-162.

Mankoff, J., Matthews, D., Fussell, S. R., and Johnson, M. 2007. Leveraging Social Networks To Motivate Individuals to Reduce their Ecological Footprints. In *Proceedings HICSS. IEEE Computer Society, Washington, DC, 87*.

Intersection of 3 themes



Competitions

Dorm Energy Competition

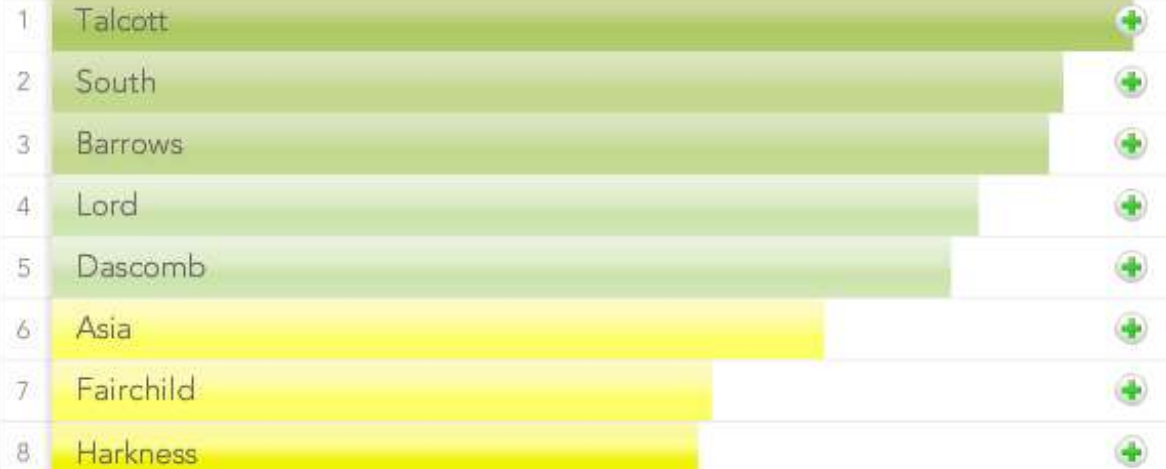
Mar 31, 0am

Apr 14, 11pm

Competition completed!

Overall standing in competition

TIMESCALE DISPLAYED:
Mar 31 - May 21



SORT GRAPH BY:



TOTAL SAVINGS:

11,909 Kilowatt-hours

Categories

Unit equivalent



Competition



Explanations



Discussion



Dorm Energy

Building Dashboard*

<http://buildingdashboard.com/clients/oberlin/dormenergy/>

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), 16-33.

Competitions

Dorm Energy Competition

Mar 31, 0am

Apr 14, 11pm

Competition completed!

Overall standing in competition

TIMESCALE DISPLAYED:
Mar 31 - May 21

1	Talcott		+
2	South		+
3	Barrows		+
4	Ludlow		+
5	Dascomb		+
6	Asia		+
7	Fairchild		+
8	Hughes		+

SORT GRAPH BY:

RANK NAME



TOTAL SAVINGS:

11,909 Kilowatt-hours

Categories

Unit equivalent



Competition



Explanations



Discussion



Dorm Energy

Building Dashboard

Can this work at IU?

What social and design factors will determine success?

<http://buildingdashboard.com/clients/oberlin/dormenergy/>

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), 16-33.

Purpose

Design and implement a conservation competition utilizing web-based feedback on the IU campus.

Background

Design & Implementation

Results & Criticism

Insights & New Concepts

Essential Contributors:

Essential Contributors:

David Fuente

Planning / PR

Essential Contributors:

Will Odom and James Pierce

User Research and Design

Essential Contributors:

Glenn Moulton

Metering

Essential Contributors:

Jeff Huang
Database

Essential Contributors:

Kelly Breeze

Student engagement

Design Goals

1. reduce overall energy & water consumption
2. raise awareness about environmental effects
3. educate toward long-term sustainable behaviors and attitudes
4. generally advance the broader sustainability initiative at IU

Contextual Interviews

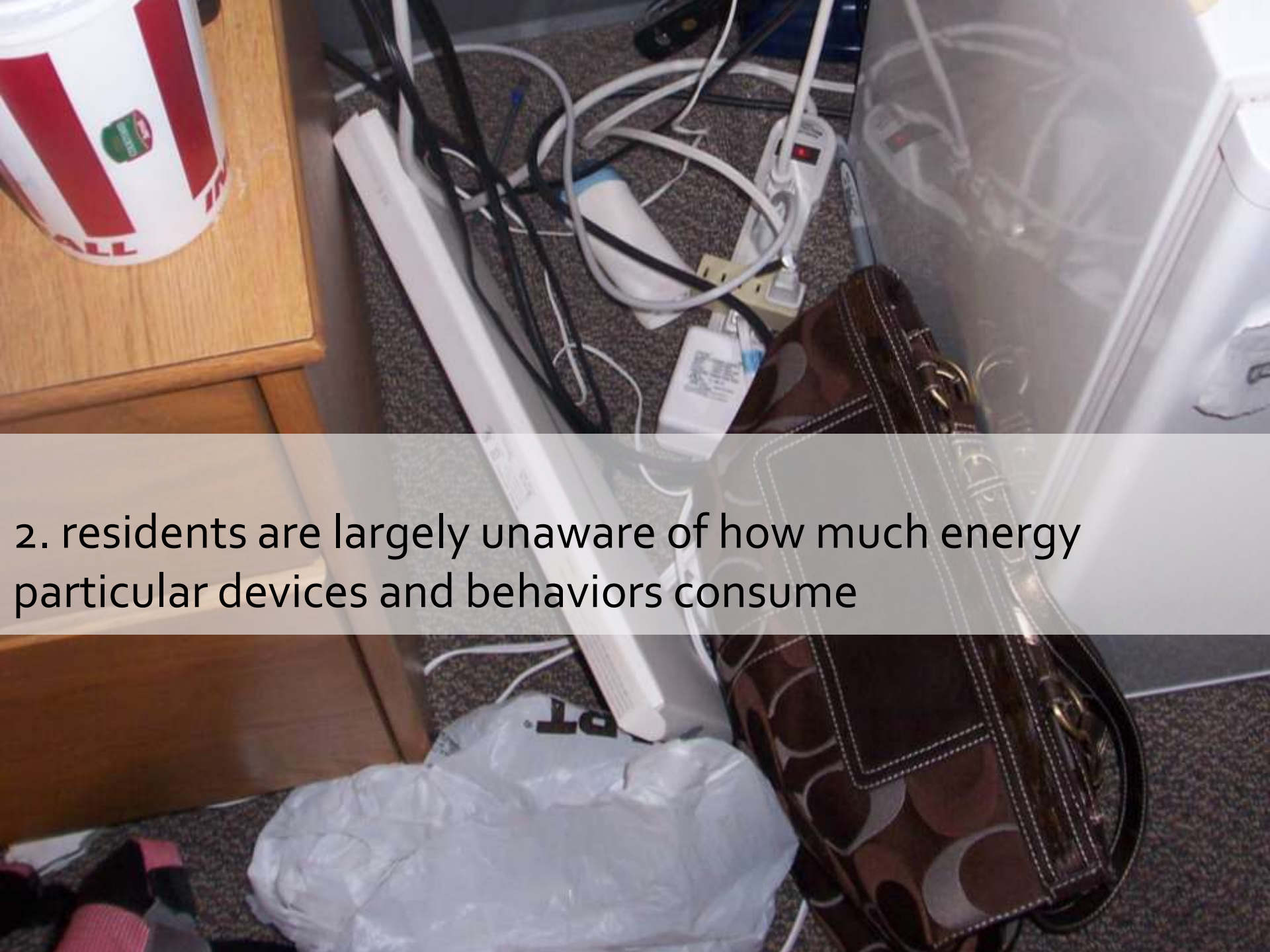
(Will Odom & James Pierce)

6 contextual interviews were conducted with undergraduate residents of dormitories across campus.





1. dormitory rooms are often cluttered with electronic devices



2. residents are largely unaware of how much energy particular devices and behaviors consume

T U R N

T U R N

I G H T

L I G H T

3. students did not know how to reduce their energy consumption beyond the most common strategies.





4. consumption behaviors are strongly influenced by their peers

Contextual Interview: Insights

Leverage social motivation.

Inform about specific behaviors.

Competition Structure

10 participating dorms

4 weeks (March 20-April 17)

Challenge: Reduce energy and water compared to previous usage

1st Prize: Cookout + \$500

2nd Prize: \$250

Web-based feedback throughout

The data

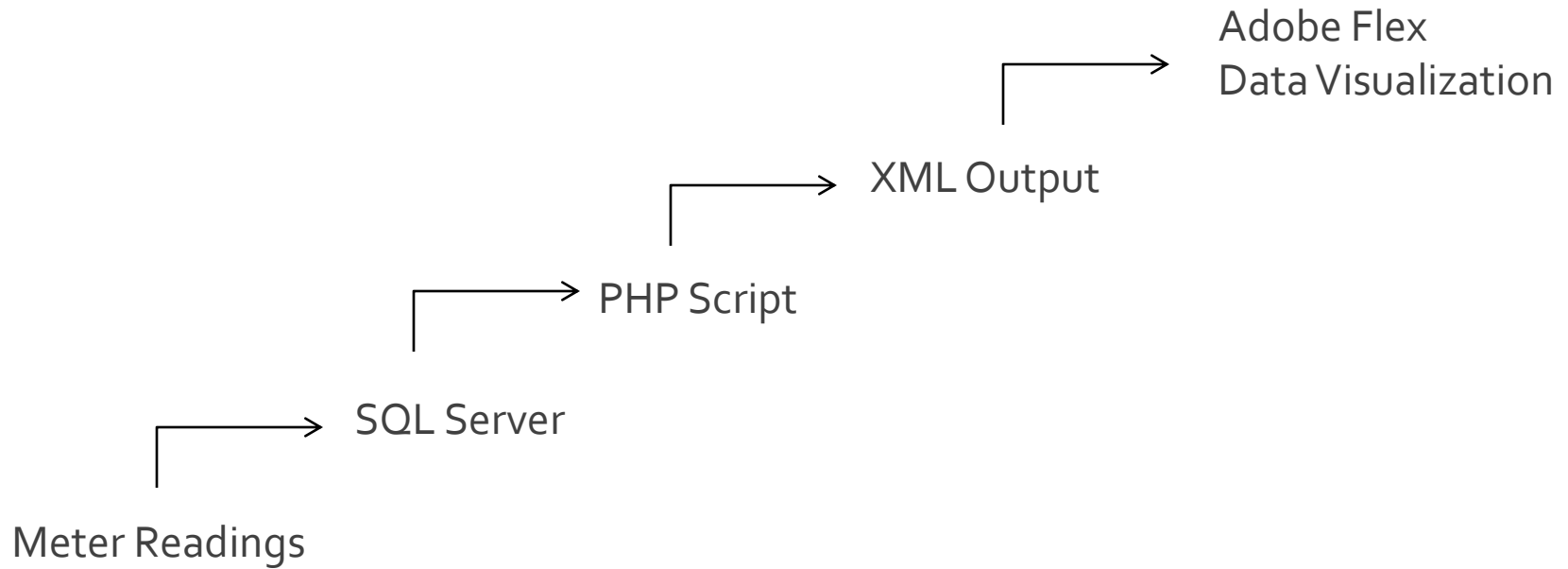
Meters were read twice per week

Uploaded to a newly created SQL Server database

2008 Water Readings

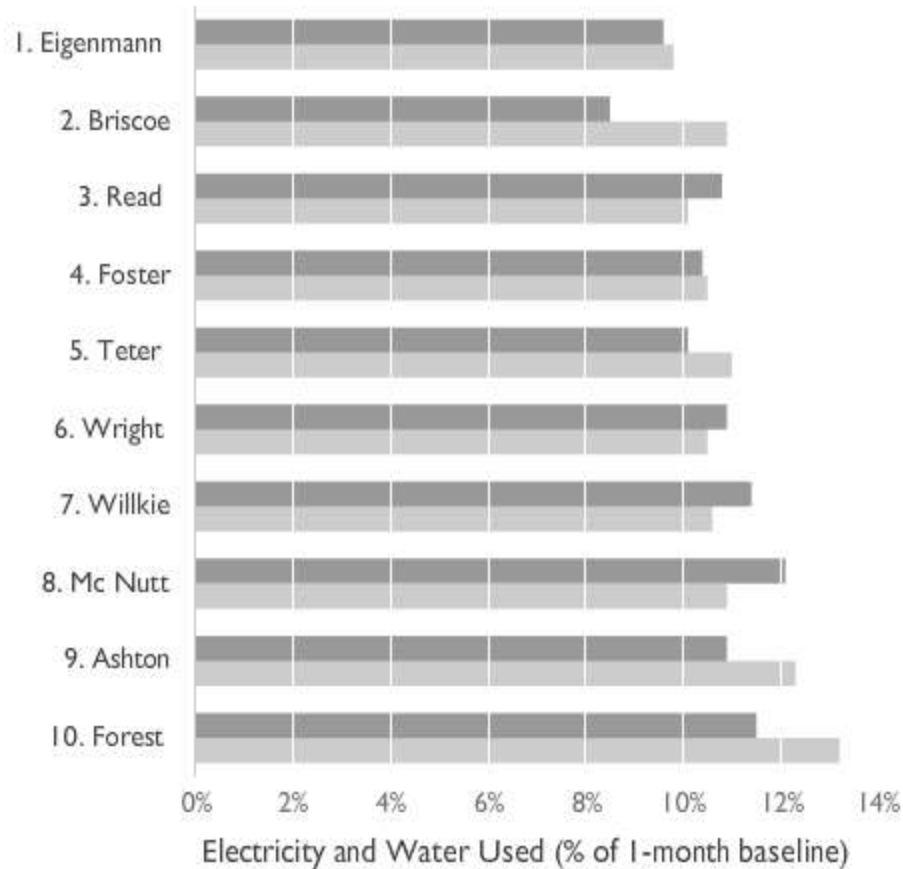
ID	building	meter #	reading	date	
16334	MOFFATT HALL	38221787	5928.000	2008-03-20 00:00:00	300
16399	MOFFATT HALL	38221787	5935.000	2008-03-24 00:00:00	300
16464	MOFFATT HALL	38221787	5941.000	2008-03-27 00:00:00	300
16529	MOFFATT HALL	38221787	5950.000	2008-03-31 00:00:00	300
16594	MOFFATT HALL	38221787	5956.000	2008-04-03 00:00:00	300
16659	MOFFATT HALL	38221787	5964.000	2008-04-07 00:00:00	300
16724	MOFFATT HALL	38221787	5971.000	2008-04-10 00:00:00	300
16789	MOFFATT HALL	38221787	5979.000	2008-04-14 00:00:00	300
16854	MOFFATT HALL	38221787	5986.000	2008-04-17 00:00:00	300
16335	JOHNSTON HALL	38221842	1667.000	2008-03-20 00:00:00	300
16400	JOHNSTON HALL	38221842	1677.000	2008-03-24 00:00:00	300
16465	JOHNSTON HALL	38221842	1684.000	2008-03-27 00:00:00	300
16530	JOHNSTON HALL	38221842	1693.000	2008-03-31 00:00:00	300
16595	JOHNSTON HALL	38221842	1701.000	2008-04-03 00:00:00	300
16660	JOHNSTON HALL	38221842	1711.000	2008-04-07 00:00:00	300
16725	JOHNSTON HALL	38221842	1719.000	2008-04-10 00:00:00	300
16790	JOHNSTON HALL	38221842	1730.000	2008-04-14 00:00:00	300
16855	JOHNSTON HALL	38221842	1737.000	2008-04-17 00:00:00	300
16339	VOS HALL	38221980	1942.000	2008-03-20 00:00:00	300
16404	VOS HALL	38221980	1956.000	2008-03-24 00:00:00	300
16469	VOS HALL	38221980	1966.000	2008-03-27 00:00:00	300
16534	VOS HALL	38221980	1980.000	2008-03-31 00:00:00	300
16599	VOS HALL	38221980	1991.000	2008-04-03 00:00:00	300
16664	VOS HALL	38221980	2005.000	2008-04-07 00:00:00	300
16729	VOS HALL	38221980	2017.000	2008-04-10 00:00:00	300
16794	VOS HALL	38221980	2032.000	2008-04-14 00:00:00	300

Data Process



Challenge Standings as of March 24

order by



Eigenmann 's Stats

53,984

kilowatt hours of electricity

115,000

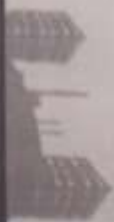
gallons of water

8,420,002

lbs of CO2

U Energy Challenge 2008

U Energy Challenge 2008



Expenditures \$500
hour building campus
The hours for
defueling per hour
cost

\$ 25,000

400,000 kilowatt hours

75,000,000 lbs of CO₂

2008
three
months

Challenge begins at 8:00 AM 11



1000

Evaluation Results

Additional color tagging was needed to help users avoid confusion.

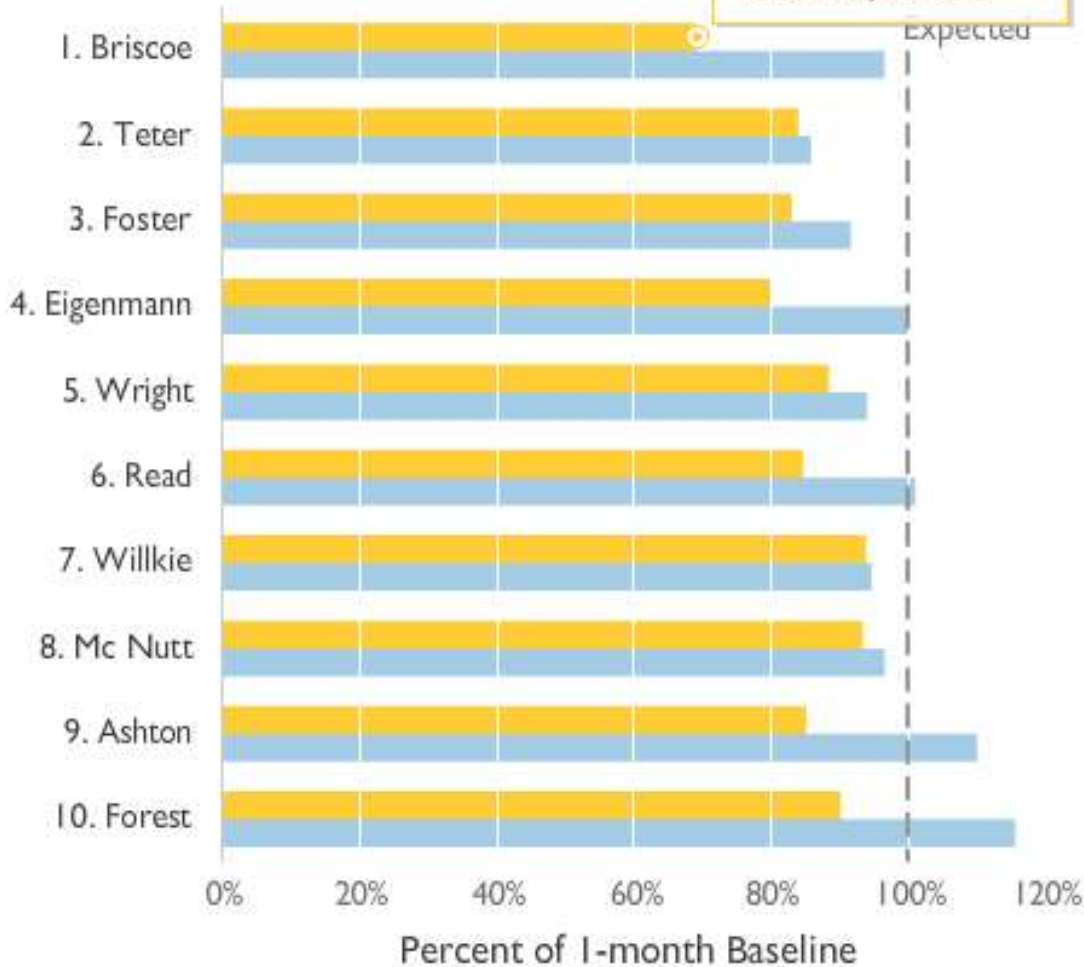
Our users did not seem to be motivated by raw numbers of reduction alone (e.g. total tons of carbon dioxide reduced, etc.).

Study participants wanted control over seeing both their own impact and their dorm's total consumption.

Current Standings

Total Usage from March 20-April 17:

Click on a bar to see that hall's stats



Briscoe - 1st place
Electricity: 69.2%

Briscoe's Stats

March 20 - April 17

Per person Dorm total

- 167**
kilowatt hours consumed
equivalent to **279**
60W bulbs burning for 100 hours
- 1,596**
gallons of water consumed
equivalent to **997**
toilet flushes
- 540**
lbs of CO2 produced*
equivalent to **0.05**
cars driven for one year

■ Electricity ■ Water

IU Energy Challenge 2008



[HOME](#) [CURRENT STANDINGS](#) [OFFICIAL RULES](#) [CONSERVATION TIPS](#) [USEFUL LINKS](#) [CONTACT](#)

Latest News

At the end of the competition, Briscoe Quad and Teter Quad claimed first and second place, respectively. Residents of Briscoe reduced their electricity consumption by 31 percent and water consumption by 3 percent. For their efforts, Briscoe will receive \$500 and a will get celebratory cookout this Saturday, courtesy of RHA. Teter will receive \$250.

Overall, students in the 10 participating dorms have conserved an estimated 446,139 kWh of electricity and 613,919 gallons of water. Remarkably, the students' conservation efforts resulted in an estimated \$26,000 in avoided utility costs and 801,454 pounds of carbon dioxide emissions, which is equivalent to taking 67 passenger cars off the road for one year!

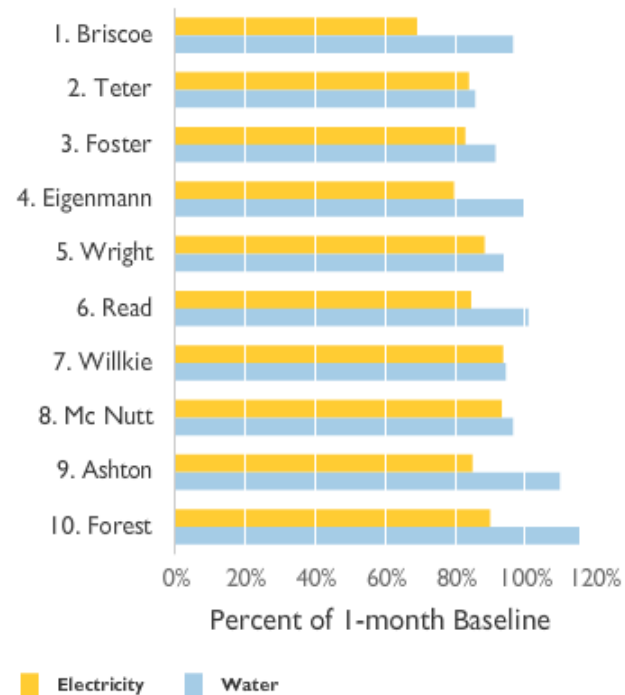
Check out the latest [press release](#) announcing the final results. Congratulations to all those who participated!

News Links

Check out the official [IU press release](#).

Current Standings

Total Usage from March 20-April 17:



Go to the [current standings page](#) to view the full statistics.

sponsored by

Residence Halls Association · Sustainable Interaction Design Research Group
Volunteers in Sustainability · Utility Information Group · Physical Plant Utilities · Sustainability Task Force

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Applications

edit

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-  Greenbook

▼ more

Puma at Like.com



Cool sneakers. Huge selection, great deals!

More Ads | Advertise

IU Energy Challenge 2008

Indiana

Information

edit

Group Info

Type: Common Interest - Activities
 Description: From March 20th through April 17th students at Indiana University-Bloomington will participate in the campus' first "IU Energy Challenge", a dorm energy and water conservation competition.

Join this group to get latest updates throughout the competition.

Contact Info

Email: sustain@indiana.edu
 Website: <http://energychallenge.indiana.edu>
 City/Town: Bloomington, IN

Recent News

edit

Here are the final standings. Congrats to the winners!

1. Briscoe
2. Teter
3. Foster
4. Eigenmann
5. Wright
6. Read
7. Willkie
8. McNutt
9. Ashton
10. Forest

Check out the full statistics on the contest website:
<http://energychallenge.indiana.edu/>

Check out the latest IU press release:
<http://newsinfo.iu.edu/news/page/normal/8063.html>

Give your feedback! Take our quick 5 minute web survey:
<http://tinyurl.com/6qug5t>

Photos

Displaying 4 photos

Add Photos | See All



Message All Members

Edit Group

Edit Members

Edit Group Officers

Invite People to Join

Create Related Event

Leave Group

Share +

Group Type

edit

This is an open group on the Indiana network. Anyone from Indiana can join and invite others from Indiana to join.

Admins

- David Roedl (creator)
- Kelly Breeze



First Annual IU Energy Challenge

March 20 - April 17 2008

4 Weeks
10 Residence Halls
8,940 Students
? lbs CO₂ avoided

Ten dorms will compete to
reduce their water and
electricity consumption

Ashton, Briscoe, Eigenmann, Forest, Foster,
McNutt, Read, Teter, Wilkie, Wright

First Prize

Celebratory End-of-the-year Cookout
\$500

Second Prize

\$250

<http://energychallenge.indiana.edu>

Thursday, May 22, 2008

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Last modified: Wednesday, March 19, 2008

Students compete to conserve energy and water in 'IU Energy Challenge'

 [E-mail this page](#)  [Print this page](#)

FOR IMMEDIATE RELEASE

March 19, 2008

BLOOMINGTON, Ind. -- Students at Indiana University Bloomington will participate in the campus's first "IU Energy Challenge," a dormitory energy and water conservation competition. Combining student residential life, graduate research and campus operations, the competition integrates numerous aspects of campus life to promote greater environmental sustainability on campus.

The project is a collaborative effort between the Residence Halls Association, the School of Informatics, IU Physical Plant Utilities and the IU Sustainability Task Force. The competition will take place March 20 through April 17 and will culminate in an award celebration during Earth Week.

Media Contacts

- Steve Hinnefeld
University
Communications
slhinnef@indiana.edu
812-856-3488

News by Category

Campuses:

- [IU Bloomington](#)

Schools:

- [School of Informatics](#)

[More Categories >>](#)

Related Links

- [IU Energy Challenge 2008](#)
- [Campus Sustainability Task Force](#)

Background

Design & Implementation

Results & Criticism

Insights & New Concepts

The Winners

1st Place - Briscoe

electricity: -31% water: -3%

2nd Place – Teter

electricity: -16% water: -14%

Average

electricity: -15% water: -2.5%

Estimated Savings

electricity: 446,139 KWh

equivalent to 743,562 60 watt bulbs burning for 10 hrs

water: 613,919 gallons

equivalent to 383,700 toilet flushes

total cost avoided: \$25,972

total CO₂ avoided: 801,454 lbs

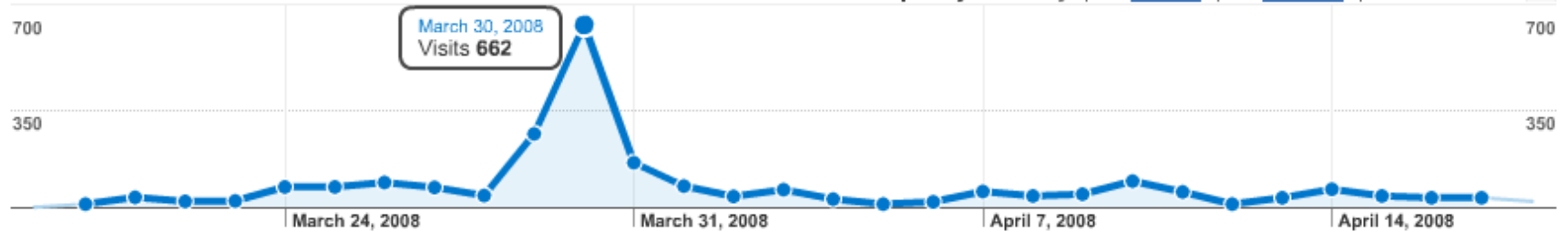
equivalent to 67 cars off the road for 1 year

Mar 20, 2008 - Apr 17, 2008

Comparing to: [Site ?](#)


Export

Graph by: Day | [Week](#) | [Month](#) | Visits




Site Usage


 **2,290** [Visits](#)

 **4,992** [Pageviews](#)

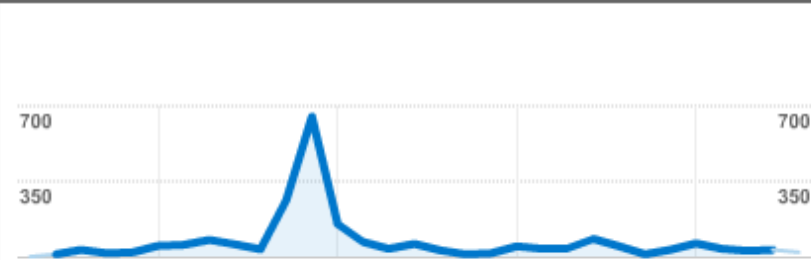
 **2.18** [Pages/Visit](#)

 **46.16%** [Bounce Rate](#)

 **00:01:21** [Avg. Time on Site](#)

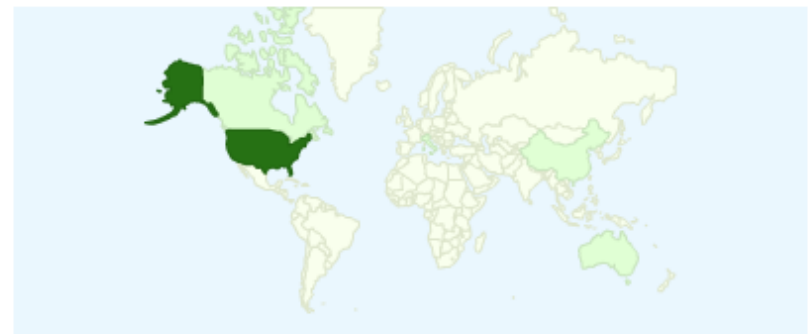
 **75.02%** [% New Visits](#)

Visitors Overview



1,719 Visitors

Map Overlay



Members

[edit](#)

This group has 118 members at Indiana.

[See All](#)

Janelle Phillips



Nina Onesti Perry



Jacob Britt



lisa batchos



Max Jacobs



Carol Diaz

The Wall

Displaying 10 of 12 wall posts

[Write Something](#) | [See All](#)



Jess Meyer wrote
at 11:00pm on April 10th, 2008

What happened with Teter this past week?! That's exciting.

[Report](#) - [Delete](#)



Michael Gold wrote
at 11:05pm on March 30th, 2008

man, what's up with the water-wasting at forest?

[Report](#) - [Delete](#)



Tiffany Ainsley Proffitt wrote
at 6:36pm on March 30th, 2008

Go Collins....everybody just hatin!

[Report](#) - [Delete](#)



David Roedl wrote
at 3:02pm on March 30th, 2008

The baselines were calculated by averaging April usage numbers from the past 3 years. This should even out some of variability to provide a reasonable benchmark.

So far, the stats look pretty good. After 1 week, we'd expect to see 25% of baseline and just about all the dorms have used a little bit less.

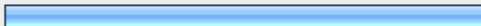
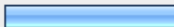


[Delete](#)












Mark Rees wrote
at 11:05pm on March 29th, 2008

well here is something you might want to consider....
from the looks of the stats you took one week and

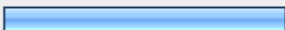

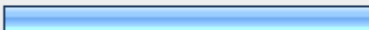


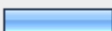

1. Which year are you?

		Response Percent	Response Count
Freshman		59.6%	28
Sophomore		21.3%	10
Junior		14.9%	7
Senior		4.3%	2
		answered question	47
		skipped question	2



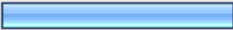


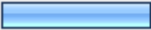

2. Which residence hall do you live in?

		Response Percent	Response Count
Ashton		2.1%	1
Briscoe		4.3%	2
Eigenmann		19.1%	9
Forest		6.4%	3
Foster		40.4%	19
McNutt		0.0%	0
Read		6.4%	3
Teter		8.5%	4
Willkie		8.5%	4
Wright		4.3%	2
		answered question	47
		skipped question	2

3. How did you first hear about the Energy Challenge?

		Response Percent	Response Count
I haven't heard about it before		0.0%	0
A friend told me		31.0%	13
My RA told me		14.3%	6
Poster		40.5%	17
Email		28.6%	12
Facebook		14.3%	6
Newspaper		11.9%	5
Radio		0.0%	0
Other (please specify)  view			11
		answered question	42
		skipped question	7

7. What issues, if any, prevented you from participating more fully in the Energy Challenge? (Check all that apply)

		Response Percent	Response Count
There weren't any, I live for this stuff!		23.3%	10
I didn't hear about it until too late		30.2%	13
The prizes weren't really exciting enough		25.6%	11
The effect on my lifestyle would have been too drastic		2.3%	1
No one else was competing so there didn't seem to be a point		44.2%	19
I needed more information regarding how to reduce my energy and water usage		16.3%	7
	Other (please specify)  view		3
		answered question	43
		skipped question	6

Summary

Only a minority of students got excited about the competition.

But it was enough have significant impact.

Improvements for next year

Better prizes

More visibility

Include Collins

Feedback should be more present and more engaging

Competitions

Dorm Energy Competition

Mar 31, 0am

Apr 14, 11pm

Competition completed!

Overall standing in competition

TIMESCALE DISPLAYED:
Mar 31 - May 21

1	Talcott		+
2	South		+
3	Barrows		+
4	Ludlow		+
5	Dascomb		+
6	Asia		+
7	Fairchild		+
8	Hughes		+

SORT GRAPH BY:

RANK NAME



TOTAL SAVINGS:

11,909 Kilowatt-hours

Categories

Unit equivalent



Competition



Explanations



Discussion



Dorm Energy

Building Dashboard

Can this work at IU?

What social and design factors will determine success?

<http://buildingdashboard.com/clients/oberlin/dormenergy/>

Petersen, J. E., Shunturov, V., Janda, K., Platt, G., & Weinberger, K. (2007). Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives. *International Journal of Sustainability in Higher Education*, 8(1), 16-33.

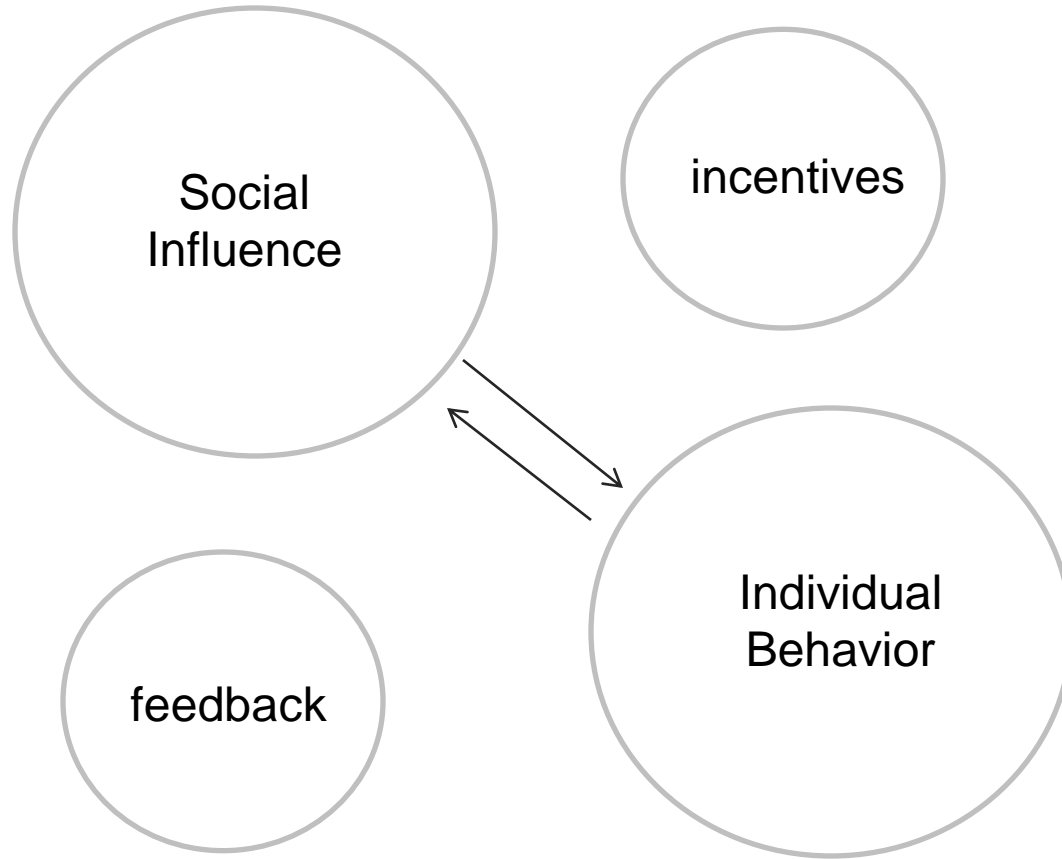
Background

Design & Implementation

Results & Criticism

Insights & New Concepts

Factors for motivation



Social incentive

Insight: Social motivation is critical for participation.

"...if all the girls on my floor really wanted to win, I'd try to save energy; otherwise, I probably wouldn't do anything differently."

- Amy, college freshman

Prescriptive feedback

Insight: Students are often unaware of how to best alter behavior to conserve resources.

"Besides turning off the lights, I don't even know what I *could* do to save energy."

- Sarah, college junior

Testing Conceptual Directions

We conducted preliminary testing to obtain feedback on different conceptual directions.



Real-time
Consumption
Information



Ambiguous
Representation



Competition
Standings



Social Incentive




Prescriptive
Feedback

Pledge Wall / Initial Mockup

Student Pledge Action

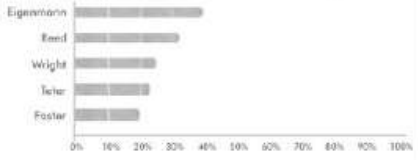
Eigenmann Hall

Current Stats



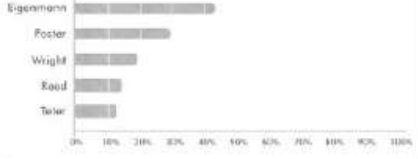
Cost Per Person / Per Month
\$26
420 Kilowatts
76,000 lbs Co2

Top 5 Total Dorm Pledges



Dormitory	Percentage
Eigenmann	~38%
Reed	~32%
Wight	~28%
Teter	~22%
Foster	~18%

Top 5 Total Dorm Reduction



Dormitory	Percentage
Eigenmann	~42%
Foster	~32%
Wight	~28%
Reed	~18%
Teter	~12%

Stephanie Worker from [1st Floor](#) pledged to:
 + turn off lights [38 other pledges](#) | [27% of your dorm](#) | [34% of all dorms](#)
 + unplug chargers [27 other pledges](#) | [55% of your dorm](#) | [18% of all dorms](#)
 Estimated Savings: \$42 | 51,000 lbs CO₂

Sheena Moore from [11th Floor](#) pledged to:
 + turn off computer [90 other pledges](#) | [75% of your dorm](#) | [42% of all dorms](#)
 + turn off lights [77 other pledges](#) | [55% of your dorm](#) | [16% of all dorms](#)
 Estimated Savings: \$50 | 66,000 lbs CO₂

Shelly Kuup from [1st Floor](#) pledged to:
 + not shower [2 other pledges](#) | [0.2% of your dorm](#) | [0.05% of all dorms](#)
 + unplug all appliances [15 other pledges](#) | [9% of your dorm](#) | [7% of all dorms](#)
 Estimated Savings: \$70 | 91,500 lbs CO₂

Jeff Shaden from [5th Floor](#) pledged to:
 + turn off lights [77 other pledges](#) | [55% of your dorm](#) | [16% of all dorms](#)
 + close windows [60 other pledges](#) | [43% of your dorm](#) | [27% of all dorms](#)
 Estimated Savings: \$53 | 69,000 lbs CO₂

Mike Tollins from [9th Floor](#) pledged to:
 + unplug chargers [27 other pledges](#) | [55% of your dorm](#) | [18% of all dorms](#)
 + turn off computer [90 other pledges](#) | [75% of your dorm](#) | [42% of all dorms](#)
 Estimated Savings: \$39 | 52,000 lbs CO₂

Mads Jensen from [1st Floor](#) pledged to:
 + not shower [2 other pledges](#) | [0.2% of your dorm](#) | [0.05% of all dorms](#)
 + unplug all appliances [15 other pledges](#) | [9% of your dorm](#) | [7% of all dorms](#)
 Estimated Savings: \$70 | 91,500 lbs CO₂

Dormitories with largest projected savings based on pledge data

Dormitories with largest actual savings

Prescriptive / Initial Mockup

Device	Action		Energy (kwh)	Cost (\$)	Graph of Weekly Usage
	Use inefficient version	Replace with efficient alternative			
Floor Lamp (compact fluorescent)	<input type="checkbox"/> Incandescent	<input checked="" type="checkbox"/> Compact fluorescent	2 +27	\$0.20 +\$2.70	
Floor Fan	<input type="checkbox"/> Air Conditioner	<input checked="" type="checkbox"/> Fan	3 +32	\$0.30 +\$2.20	
	Keep always on	Turn Off when not in use			
Desktop Computer	<input checked="" type="checkbox"/> Always on	<input type="checkbox"/> Turn off	12 -15	\$1.20 -\$1.30	
Laptop Computer	<input type="checkbox"/> Always on	<input checked="" type="checkbox"/> Turn off	3 +4	\$0.30 +\$0.40	
	Keep always plugged in	Unplug when not in use			
Flat-Screen Television	<input checked="" type="checkbox"/> Always plugged in	<input type="checkbox"/> Unplug	5 -11	\$0.50 -\$0.10	
Microwave	<input type="checkbox"/> Always plugged in	<input checked="" type="checkbox"/> Unplug	6 +1	\$0.60 +\$0.10	
Cell Phone Charger	<input type="checkbox"/> Always plugged in	<input checked="" type="checkbox"/> Unplug	.5 +0.5	\$0.05 +\$0.05	
			Room Total		
			31.5 +80.5	\$3.15 +\$6.85	

Device

Conservation Action

Projected savings (kwh, \$)

Graphical display of projected weekly usage patterns

Testing Conceptual Directions

We conducted preliminary testing to obtain feedback on different conceptual directions.



Real-time
Consumption
Information



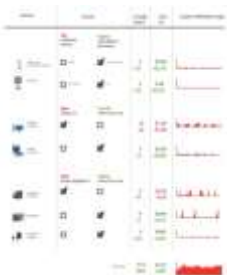
Ambiguous
Representation



Competition
Standings



Social Incentive



Prescriptive
Feedback

Conceptual Directions to Pursue

Contextual research and preliminary testing suggest pursuing underexplored conceptual directions:



Ambiguous
Representation



Social Incentive



Prescriptive
Feedback

Future Work

Apply new interactive concepts to next year's competition (James Pierce).

Design a visualization for all metered buildings on campus (this summer).

Acknowledgements

Utility Information Group • Residence Halls Association • Physical Plant Utilities

Sustainability Task Force • Volunteers in Sustainability • RPS • Michael Hamburger • Lee Walters • Loretta Hutchison • Vanessa Curuso Steve Akers • Jeff Kaden • Mark Menefee • Eli Blevis • Youn Lim • Jeff Bardzell • Erik Stolterman • Marty Siegel • HCI/d Classmates

Benefits

An immediate reduction in use - > monetary savings,
reduced environmental impact

Advancing campus sustainability - > education and
awareness, publicity for the initiative

Greater understanding of opportunities and challenges
involved in designing for behavior change

Reflection

Service Learning

Strategic Design

Prototyping

Design as Service

Design is about creating intentional change to the *real world*.

Design always works within limited time, resources, and knowledge.

“Design is about *service on behalf of the other*.”

- Nelson and Stolterman (2003)

Service Learning

Experiential learning through community service and reflection.

Primary objective was to implement the competition, intellectual goals were secondary.

Strategic Design

Interaction designs are tactical components in context of a larger system working towards long-term organizational goals.

The strategy and entire tactical system are part of the design.

Prototyping

“Design thinking is inherently a prototyping process. Once you spot a promising idea, you build it. The goal isn't to create a close approximation of the finished product or process; the goal is to elicit feedback that helps us work through the problem we're trying to solve. In a sense, we build to think.”

-Tim Brown, CEO at IDEO