Climate Action Planning at the University of Illinois

MAPPA October 4, 2010

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Commitments Signed

 American College & University Presidents' Climate Commitment (ACUPCC) - signed February 22, 2008



 Illinois Campus Sustainability Compact - second five-year commitment signed August 27, 2010

Why we developed a Climate Action Plan

It makes fiscal sense

- High Energy Costs \$77.4 million last year
- It is good stewardship

It supports State's goals

- State goals for utilities are 2% annual energy conservation and 25% renewables (ILRPS) by 2025
- iCAP is a requirement of the ACUPCC

Climate Change is THE Global Grand Challenge!



Arctic Ice Volume is at a new minimum
 Ice extent may well fall below the 2007 record this year

There's No Time to Waste!

- Seventeen of the twenty warmest years have been since 1990
- 2010 had the warmest January-June in history
- June 2010
 - the warmest on record
 - 16.2 C (61.1 F); 0.68 C (1.22 F) above the 20th century average of 15.5 C (59.9 F)
 - Previous record for June set in 2005.
 - The fourth consecutive warmest month on record
 - March, April & May 2010 were also the warmest on record
 - The 304th consecutive month with global temperatures above the 20th century average.
 - The last month with below-average temperature was February 1985.

Temperature is just the symptom

Big Ten Energy Use 2008

University	Total Energy Use (MMBTU)	MMBTU Energy Use Per 1000 sq. ft.	MMBTU Energy Use Per Student
Illinois	5730016	284.9	142.9
Indiana	4511319	289	106.5
Iowa	3516320	214.4	115.9
Michigan	6400287	205.3	156
Mich State	6813950	298.3	144.7
Ohio State	4965355	225.9	90.3
Penn State	3233368	167.5	73.5
Purdue	2710161	234.3	68.3
Wisconsin	4440000	222	111.2

University of Illinois Carbon Emissions Footprint

570,000 MTE of CO2 in 2008

- •More than 85% due to buildings
 - *and carbonized fuel use at Abbott Power Plant*
- A relatively low transportation footprint



Unconstrained Emissions Projections



Student Involvement

- Active student involvement
 - participated in authorship
 - critical to plan adoption
- Passed Student Green Fee Increase
 - demonstrated strong student commitment to sustainability
- Students lobbied for a strong Climate Action Plan
 - collected signatures
 - attended public forums
 - met with Chancellor
- Students adopted "Beyond Coal" in 2010 and built an alliance with the Sierra Club



Plan Development

- Strategies for Campus Sustainability discussed by Chancellor's Sustainable Operations Task Force
- \circ Significant data collection and interview process
 - Finding content experts
 - getting information
 - Two open public workshops to collect input from campus and community
- First Draft of Plan Generated over Winter Break
- Plan Developed by one Faculty Member, one Student and one Staff Member, in their "spare" time
- Strategies Presented to Chancellor's Sustainability Council
- Draft Finalized during end-March / early-April
- Targets Negotiated in late-April / early-May

iCAP: A Climate Action Plan

- 1. Energy Conservation
- 2. Financing
- 3. Eliminate Coal Use
- 4. Use Renewables
- 5. Transportation Improvements
- 6. Building Standards
- 7. Land & Space Conservation Policies
- 8. Procurement & Waste Reduction
- 9. Water Conservation
- 10. Planning
- 11. Follow Through



Major Campus Commitments Summary

- Reduction in Building Energy Use and Carbon Emissions by 40% by 2025
- Elimination of on-campus coal use by 2017
- 25% Renewable Energy Generation Target for 2025
- "No Net Increase in Space" Policy after currently planned construction is complete
- Other Commitments on Potable Water Use, Local Foods Purchasing, Active Transportation, Methane Capture, Life-Cycle Costing etc.
- Net Effect of reducing total emissions by over 55% by 2025
- And NET ZERO by 2050!

Net Zero Mitigation Wedges



Energy Conservation Reduce Building Energy Use and Emissions by 20% by 2015 and 40% by 2025



Lighting

Building Envelope

Retro-Commissioning

HVAC

Decentralize Energy Billing

Create Centralized Funding Pool w/ Adequate Funding (\$150 Million+ over 10 years)

IT and Electrical Equip

Domestic Hot Water

Fume Hoods

Behavioral Change



Progress 2015 targets for energy conservation have been met



Use Renewable Energy

• Renewables Targets

- 25% by 2025
- 17.5% by 2020
- 5% by 2015 (Equivalent of about 15 Utility-Scale Wind Turbines – or lots of RECs)

• Wind Turbine

- procurement in progress for 1-3
- 1.5 MW on South Farms

• **Biofuels**

 possible interim strategy but can only be co-fired with coal unless bio-gasification is available



Eliminate Coal Use

- 2017 targeted
- Generation inventory
 - 3 coal boilers
 - 3 gas boilers
 - 2 gas turbines
- Generate steam
 - Electricity is a by-product
- Conservation
 - Steam demand down ~27% in past 3 years
 - Objective to reduce steam use another ~10-20% so the gas capacity is sufficient to supply total steam load

The U of I burned 94,000 tons of coal in FY09 and 66,000 tons in FY10



Green Building Standards

• LEED

- Gold as Building Standard
- Platinum by 2015
- No Net Increase in Building Space
 - After currently planned construction is complete



 Any Campus Construction post 2025 must be netzero Emissions

Some Challenges

- \circ Transportation
 - Need better information about current faculty, staff, and student commuting patterns
- o Food
 - 30% of campus food purchasing from within 100 miles by 2015
- o Waste
 - Waste Diversion Rate from current 50% to 75% by 2020



iCAP Implementation

The iCAP has been critical for setting up a framework

And for getting the campus to set ANY targets

• iCAP is a living document

- We will do better than we expect, and can tighten our targets as we proceed
- We want to maximize on-campus renewables

Energy Conservation in iCAP

9.4 Targets and Strategies

9.4.1 Building Energy Conservation Targets and Strategies

Targets

The University will meet the following goals compared to the fiscal year 2008 energy and emissions levels for existing buildings:

1) Reduce building energy consumption by:

- a) 20 percent by fiscal year 2015
- b) 30 percent by fiscal year 2020
- c) 40 percent by fiscal year 2025.

2) Reduce building related GHG emissions by:

- a) 15 percent by fiscal year 2015
- b) 30 percent by fiscal year 2020
- c) 40 percent by fiscal year 2025.

These targets will be constantly re-evaluated based on performance measures and changes in technology on at least an annual basis. Campus has already shown that it is capable of successfully taking on the energy problem, achieving a 9.6 percent reduction in energy consumption per square foot throughout the past two years. In order to achieve these targets, campus investment in energy conservation will need to increase above current levels. Additionally, individual colleges will need to be incentivized so that they seek to reduce their consumption, buy efficient research equipment and invest their own funds.

Strategies

1) Complete all SAIC-prescribed energy conservation measures by 2022.

2) Implement decentralized energy billing at the college level. Immediately establish a dedicated, centralized funding pool for energy conservation projects. This "clean energy" fund will allow for both internal (student fees, faculty contributions, staff contributions, energy savings reinvestment, capital programs), and external (programs, rebates, donations, outside investors) participation in the fund. It will be established as a capital infusion and coordination mechanism aimed at physical energy and energy cost reductions that also allows for the sustained maintenance of these investments.

3) Allocate proper maintenance funds to ensure that the energy reductions are sustained, and reorganize building maintenance procedures to support long-term energy savings.

iCAP Assignments

1.	Real-Time Energy Displays 8/15/2011	Behavior Change	Joe Rix
2.	Energy Liaisons - Presentations in Individual Buildings 5/1/2011	Behavior Change	Andy Blacker
3.	Eco-Reps Pilot Program 9/1/2010	Behavior Change	Laura Haber, Amy Allen
4.	AFMFA funding use for sustainability needs 9/15/2010	Funding for Sustainability	Doris Reeser
5.	Weatherization of existing campus buildings 5/15/2011	Energy Conservation	Carl Wegel
6.	Fume Hoods Reduction 6/30/2015	Energy Conservation	Jeremy Neighbors
7.	Fume Hoods Conversion from CAV to VAV 6/30/2015	Energy Conservation	Jeremy Neighbors
8.	Fume Hoods Education 6/30/2011	Energy Conservation	Jeremy Neighbors
9.	Update standards for new construction, major renovations 8 10/15/2010	k replacement units Energy Conservation	Karen Ille
10.	Insulation of Hot Water Tanks 6/01/2014	Energy Conservation	Carl Wegel
11.	Recovered Heat	Energy Conservation	Clark Wise
12.	Temperature Setbacks-Energy Use Police Enforcement 10/01/2010	Energy Conservation	Kent Reifsteck
13.	Campus Computer policy update and enforcement 6/30/2012	Energy Conservation	Sally Jackson
14.	Purchasing Standards for Energy Conservation 6/30/2012	Energy Conservation	, Maxine Sandretto
15.	Lighting Retrofit Project Completion 5/15/2012	Energy Conservation	Eva Sweeney

iCAP "to do items"

Commitment	#	iCAP recommendations	F&S contacts	Tasks	First Step	Notes
1. Energy Conservation	1.1	Educate building occupants + public through real-time energy displays in buildings and electronic media. Publish a website that shows this data for campus buildings, use a computer science class to create it.	temperature control, Guy Grant, John Prince, RCx also	Publish a website that shows real-time energy usage for campus buildings - set up a physical display in a highly visible location.	reach out to someone in CS or ECE senior design, see if they will take this on as a project for the fall.	what kind of data can you put on the site. Meters are manually read in most cases - some are smart meters with a lot more data. Display - can show campus has used XX amount, but with real-time data - need to pilot it with something that is not too difficult, likeAbbott Power Plant used XX energy yesterday, and with a building that has a smart meter
1. Energy Conservation	1.1	Use F&S Energy liaisons and various campus sustainability committees as grassroots contacts for campus initiatives. Encourage departments to seek reasonable temperature settings in the buildings they occupy. Repeat awareness of Energy Use Policy.	Andy Blacker, also need this at the student level too	Use the Liaisons more - pilot a Eco-reps program for Housing	talk to RCx folks about their conversations with building occupants	how can this be enforced? Whistle blowers? Students? The energy liaisons can do the enforcement for us. Suhail is working with Laura Haber at Housing with students to set up Eco- reps. Can do it with a departments' students, but the res halls have a lot more info. So students in some locations, and liaisons for other locations, with some overlap
1. Energy Conservation	1.1	Larger-scale renovations or replacements of the existing building stock. "Green Buildings" with new low-energy building standards.	Fred Hahn, Engineering		talk to Doris - get access to VFA list	need to have a plan to replace ancient buildings with green buildings and design. As they look at the VFA list, the priorities change and the reasons behind the changes - can the goals for improved sustainability influence the AFMFA spending choices?
1. Energy Conservation	1.1	Improve Envelopes in buildings, Replace windows, inprove insulation levels, retro-fit entry ways via renovation projects	Fred Hahn and Doris Reeser	Update standards for major renovations	change the standards	more about renovations - change standards
1. Energy Conservation	1.1	Tighten building infiltration and exfiltration. Basic simple weatherization of campus buildings, via maintenance	Fred Hahn and Carl Wegel	Assess leaks with thermal imaging camera to prioritize weatherization	form teams and a plan, change the standards	improve weatherization - small stuff - thermal cameras with students - there are probably some at F&S, work the Energy Liaisons to form teams - have a pilot program created, if it works, get grant funding, show results to fund with savings. Are their building standards about building infiltration and exfiltration - how are they enforced? need to understand the point where it needs to be a major renovation
1. Energy Conservation	1.1	Reduce the number of fume hoods in operation by 20-25%.	Jeremy Neighbors			

iCAP Assignments

8/4/2010

iCAP Assignments: Curt Taylor

Energy Liaisons - Presentations in Individual Buildings

Behavior Change

Andy Blacker

iCAP Commitment

5/1/2011

2

Use F&S Energy liaisons and various campus sustainability committees as grassroots contacts for initiatives. Encourage departments to seek reasonable temperature settings in the buildings they occupy. Repeat awareness of Energy Use Policy.

Project Description

Train and support Energy Liaisons to set up and staff a display in various buildings with posters, examples, and data about the specific building, to effect behavior change on campus with regards to sustainability (energy usage, recycling, water use)

iCAP Assignments

<< 8/22/2010 DRAFT - for Facilities & Services internal use>>

2 iCAP

Assignment

Deadline

5/1/2011

iCAP Commitment

Use F&S Energy liaisons and various campus sustainability committees as grassroots contacts for initiatives. Encourage departments to seek reasonable temperature settings in the buildings they occupy. Repeat awareness of Energy Use Policy.

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Energy Liaisons - Presentations in Individual Buildings

Results Desired

Behavior Change
Contact Info Andy Blacker

Facilities & Services

Project Description

Train and support Energy Liaisons to set up and staff a display in various buildings with posters, examples, and data about the specific building, to effect behavior change on campus with regards to sustainability (energy usage, recycling, water use)

To do list

Estimate resources needed (CRC time, Energy Liaison time, display materials, etc).
 Create the plan for presentations/displays, with schedule planned by September 2010.

Start with the presentations during Sustainability Week, Oct 25-29.

4) Assist with set up and staff the displays with Energy Liaison and possibly other

departmental/student volunteers, for 12 buildings by May 15, 2011.

Notes

This will require working with the Energy Liaisons to help their building occupants/users reduce energy usage both on and off campus.

To change the behavior, go to specific buildings. Start with big buildings. For example, at the English Building a display should be at the NW entrance in the hallway for a few hours. It should have a table, with easels, displays, maybe even a laptop.

Displays should include the energy that building used last year, and a recommendation for what they should have used (needs to be determined). They should share knowledge about light bulbs, water use, even residential info. Needs to include a repeat of the Energy Use Policy, and needs to prepare them for temperature setbacks. Let's include the climate action plans items as well. Will need an exhibit booth or something like it.

We should develop a pledge for people to sign, and a handout for them to keep in their wallets after they have signed on.

We need to foster champions, through Energy Liaisons and students.

Metrics

of displays shown

of people who signed onto the pledge % reduction in energy and water use in time period shortly after presentation, compared to similar time period historically.

Next step resource estimate

Next step due date 11/1/2010

iCAP Assignment Resource Estimate

iCAP #2 Assignment Resource Estimate August 16, 2010

This resource estimate is based upon starting up the program and conducting the first display/presentation in one building. Once the initial materials and templates have been created, additional building presentations will become more cost effective. The display and primary handouts will need to be tailored to each building and each liaison will need to be trained.

Material	Detail	Content	One Time	Recurring
Display	Trifold Foam Core display	Details of building energy usage,		\$180
Board	printed and mounted	campus usage, current conservation		
		efforts, tips and suggestions		
Table	Table and chairs for the display	Rented, delivered and returned by F&S		\$75-
	area	Crews		\$100
Primary	Large trifold brochure; full-color	Details of specific building energy		\$140 -
Handout	produced by Printing Department	usage, recommended usage, Energy		\$230
		Policy and iCAP goals, tips and		depending
		suggestions		upon
				quantity
				(100 or
				150) and
				design
Additional	Factsheets about	Include information about RCx,		\$26.00 per
Handouts	sustainable/energy saving	Lighting Retrofit, Recycling,		500 sheet
	activities – Produced in-house	Equipment Consumption, etc.		ream for
				premium
				recycled
				letter size
				paper

Material Requirements

Example Assignment



GREGORY HALL

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810 South Wright Street



Ī	Task Name	Duration	Start	Finish	Pr	A	ug 2	29, '1	0			Sep (5, '10	0			Se	p 12	2, 110)			Se	p 19	9, 40)			Se	p 26	δ, '
						S	M	Tγ	^V T_	F	S	SM	T	W 1	F	S	S	М	τV	V T	F	S	S	M	τΙν	V T	F	S	S	M	Т
	Contact Liaisons	7 days?	Mon 8/30/10	Tue 9/7/10																											
	Select Buildings	4 days?	Wed 9/8/10	Mon 9/13/10																											
	prepare materials	10 days?	Mon 9/13/10	Fri 9/24/10																											
	schedule presentations	6 days?	Mon 9/27/10	Mon 10/4/10																											
	train the presenters	15 days?	Mon 10/4/10	Fri 10/22/10																											
	do the presentations	145 days?	Mon 10/25/10	Fri 5/13/11																											
	report on # of pledges, etc	5 days?	Mon 5/16/11	Fri 5/20/11																											
	study success of program	22 days?	Tue 5/17/11	Wed 6/15/11																											

BUILDING DETAILS

Date Built: June 10, 1939 (Cornerstone Laid)

Square footage:

Student Usage Hours:



CURRENT PROJECTS IN GREG HALL

- HVAC (Contribution from Electrical Service Repair)
- HVAC Replacement
- Interior Repairs Phase II
- · Window Replacement and Tuckpointing





GREGORY HALL

810 South Wright Street

COMPLETED PROJECTS

- Basement Sprinkler Installation Completed Summer 2007
- Chiller Removal
 Completed Summer 2008
- Elevator Repair
 Completed Summer 2009



Repair Plan
 Completed Spring 2008

ENERGY USAGE



Energy Use Policy

University of Illinois at Urbana-Champaign

Campus Energy Goals

 Reduce energy consumption and cost by eliminating waste and increasing energy efficiency in buildings, electrical equipment used in offices and labs, and campus transportation systems.

 Shift to renewable energy resources by systematically shifting our reliance on fossil fuels to an appropriate balance of energy conservation and alternative and renewable energy sources.

III. Reduce greenhouse gas emissions from energy generation, agricultural operations, and transportation.

Questions?

