The Sustainable University

AIA/CSI

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Commitments Signed

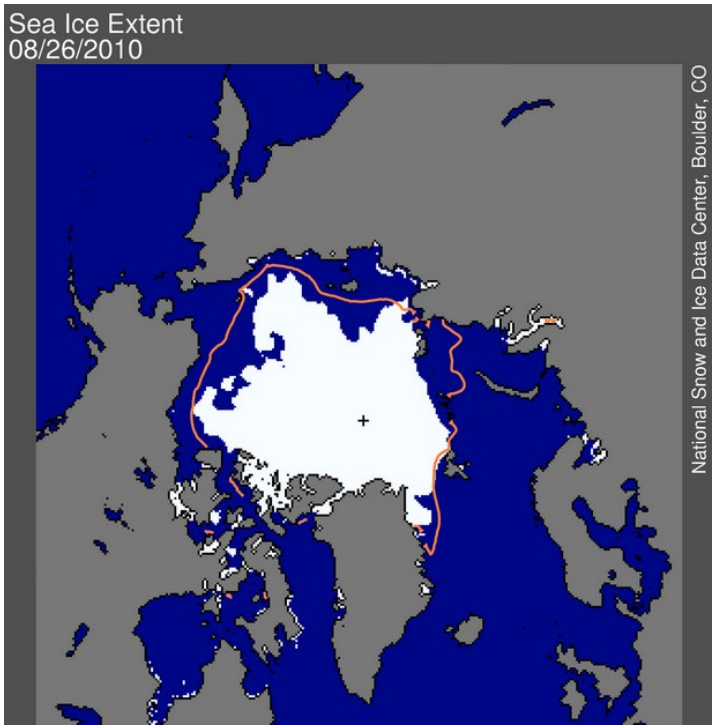
- American College & University Presidents' Climate Commitment (ACUPCC) - signed February 22, 2008

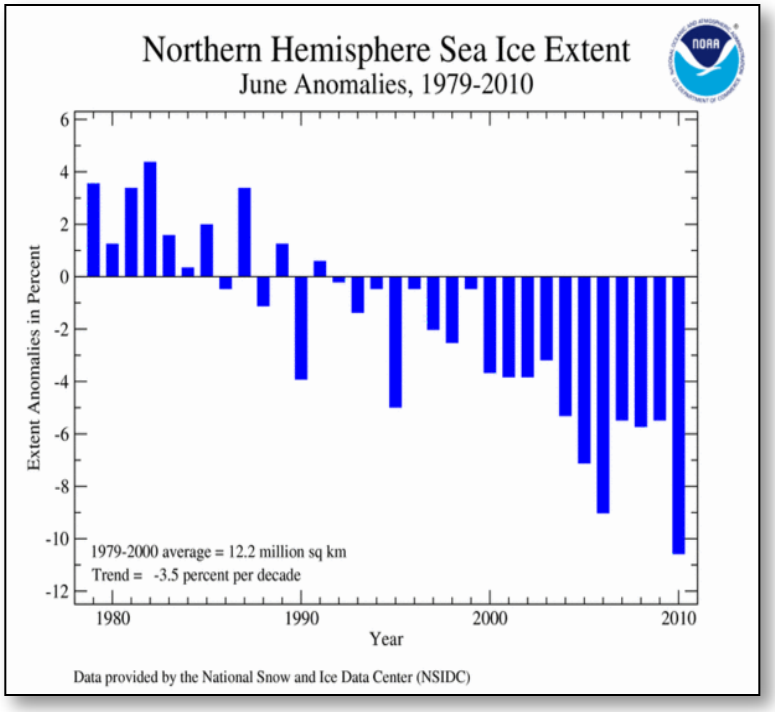
- Illinois Campus Sustainability Compact - second five-year commitment signed August 27, 2010

Why 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 Real





- 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

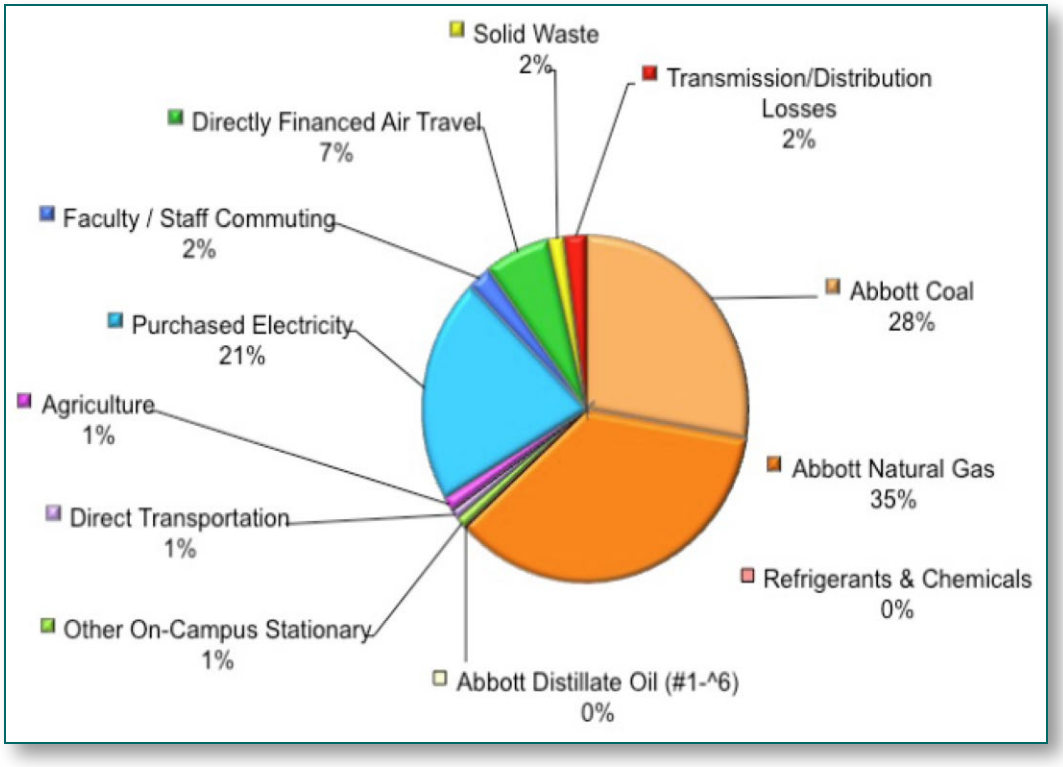
Carbon Emissions Footprint

570,000 MTE of CO2 in 2008

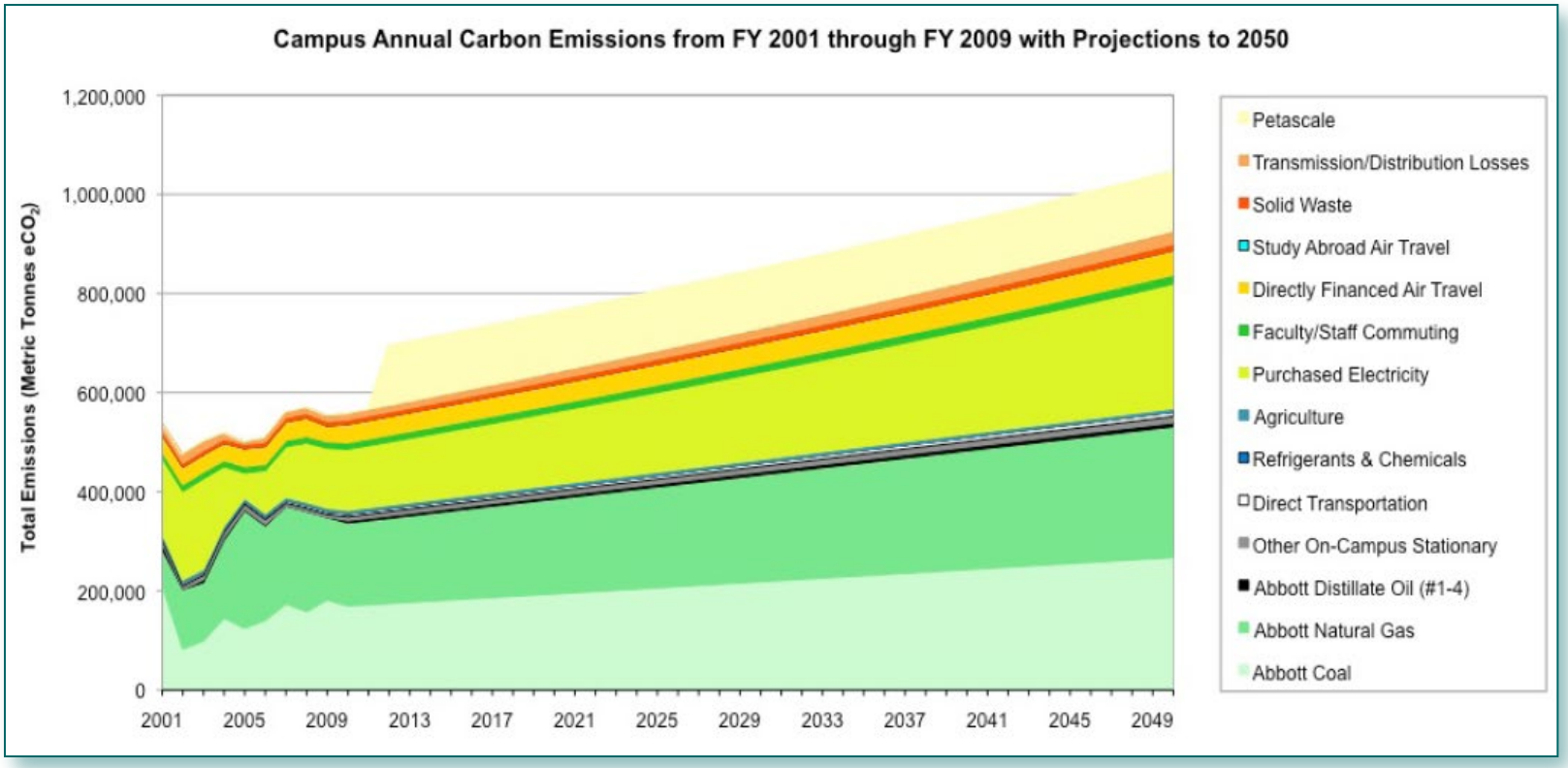
- More than 85% due to buildings

  and carbonized fuel use at Abbott Power Plant

- A relatively low transportation footprint



Unconstrained Projections



Student Involvement

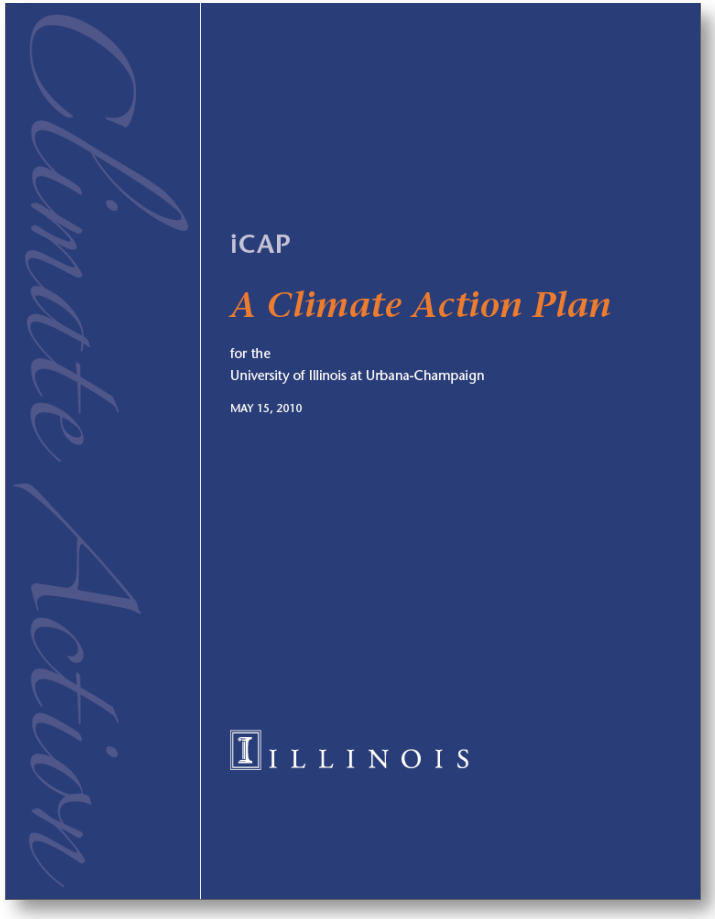
- Active student involvement
  - participated in authorship
  - critical to plan adoption
- Passed Student Green Fee Increase
  - demonstrated strong student commitment to sustainability
- Students lobbied for a strong Climate Action Plan
  - collected signatures
  - attended public forums
  - met with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

Plan Development

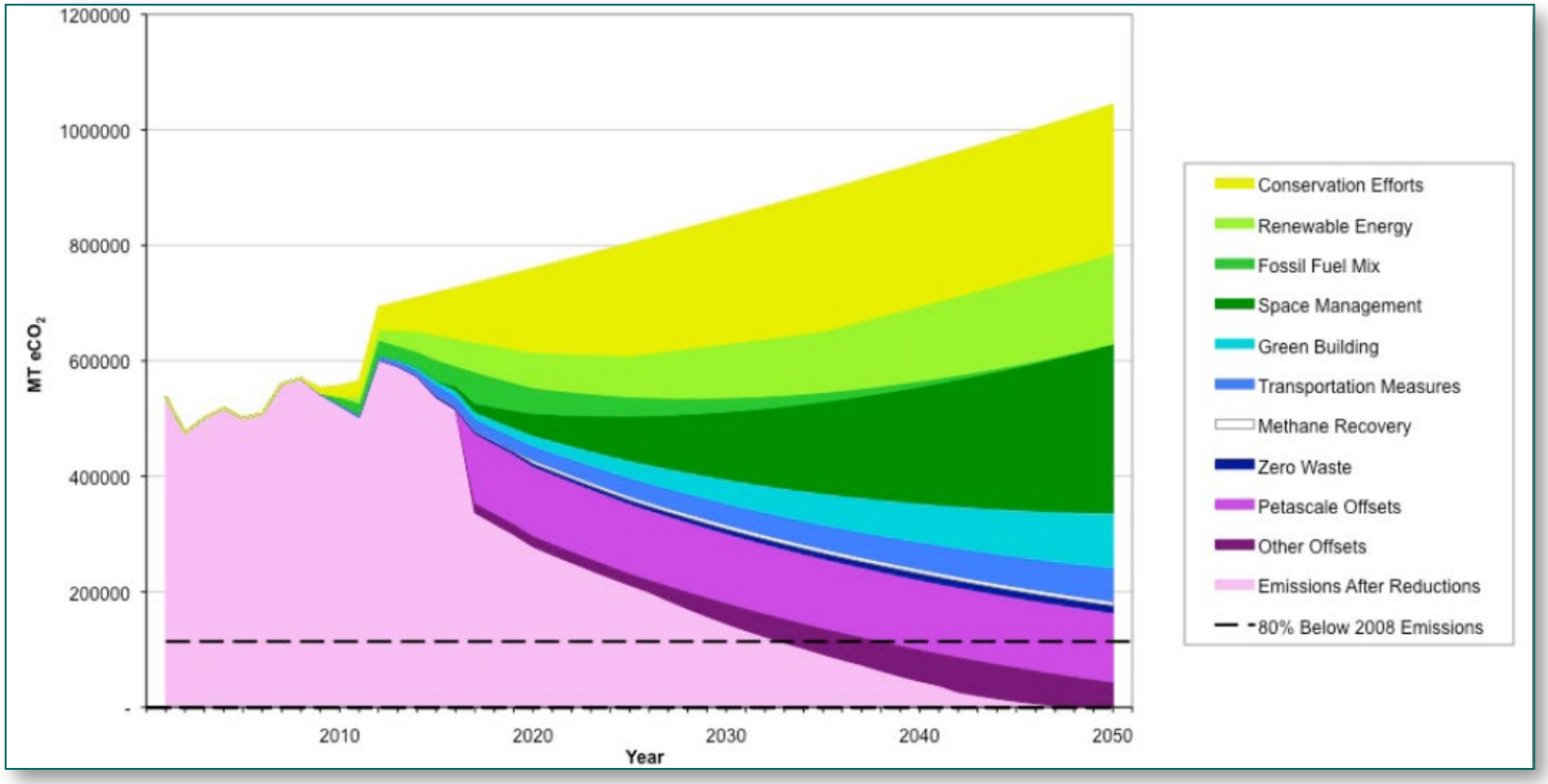
- Strategies for Campus Sustainability discussed by Chancellor's Sustainable Operations Task Force
- Significant data collection and interview process
  - Finding content experts
  - getting information
  - Two open public workshops to collect input *from campus and community*
- First Draft of Plan Generated 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



Net Zero Mitigation Wedges



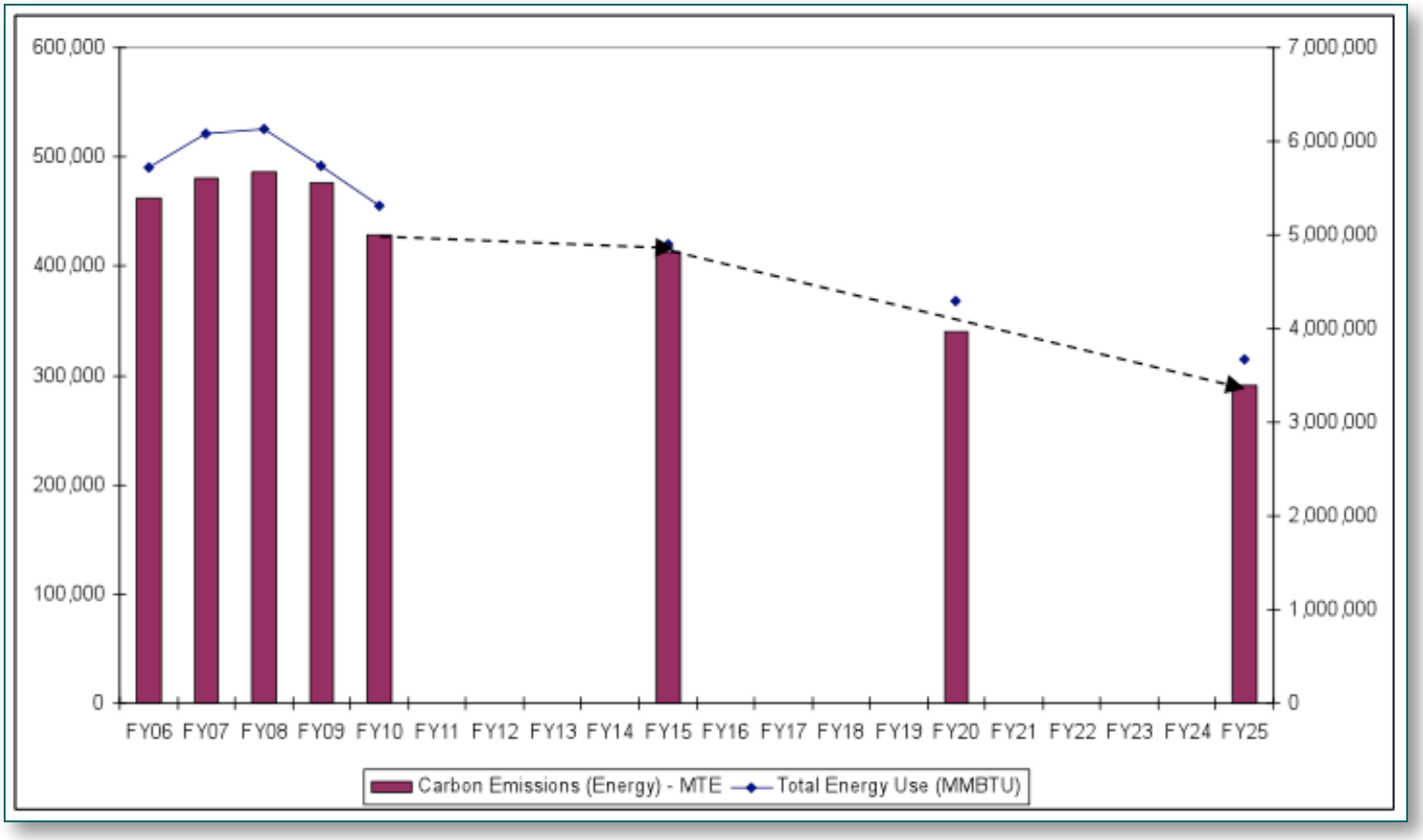
Major Campus Commitments

- 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!

Energy Conservation

5	Weatherization of existing campus buildings
6	Fume Hoods Reduction
7	Fume Hoods Conversion from CAV to VAV
8	Fume Hoods Education
9	Update standards for new construction, major
10	Insulation of Hot Water Tanks
11	Recovered Heat
12	Temperature Setbacks - Energy Use Policy
15	Lighting Retrofit Project Completion
16	Lighting Sensors Project
17	Steam System Maintenance
18	Retrocomissioning Strategic Plan
20	Green Roof Feasibility Study
22	Energy Chargeback System
23	Update Maintenance Procedures
38	2012 Campus Energy Study
54	Space Marketplace
55	Net Energy Neutral Buildings by 2025
58	Reduce Campus Square Footage
61	No Net Increase in Campus Space

Progress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Carbon Emissions (Energy) - MTE
Total Energy Use (MMBTU)

Use Renewable Energy

- **Renewables Targets**
  - 25% by 2025
  - 17.5% by 2020
  - 5% by 2015

40	Burning Biomass at Abbott Power Plant
41	Wind Turbine
42	Solar Power on Campus Parking decks
43	Campus Power Contracts for Renewables
44	Methane Capture Pilot Project at Beef and Sheep
45	Miscanthus Boiler
47	5% Renewable Sources

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 net-zero Emissions**

Some Challenges

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

iCAP Implementation

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

2 Energy Liaisons - Presentations in Individual Buildings

5/1/2011	Behavior Change	Andy Blacker

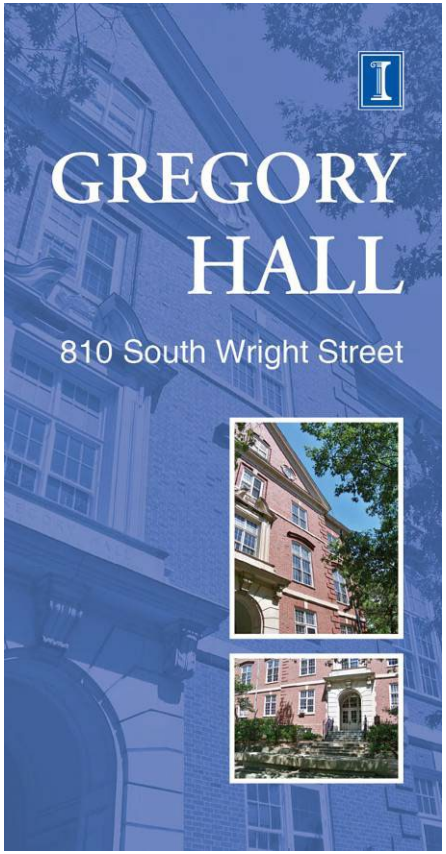
iCAP Commitment

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.

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

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.

Deadline **5/1/2011**

Project Name

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

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

iCAP #2 Assignment Resource Estimate

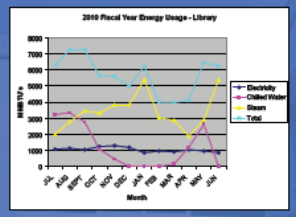
August 16, 2010

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.

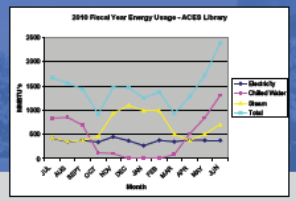
Material Requirements

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

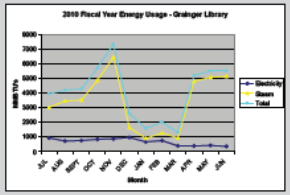
MAIN LIBRARY



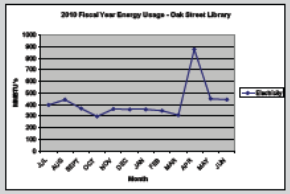
ACES LIBRARY



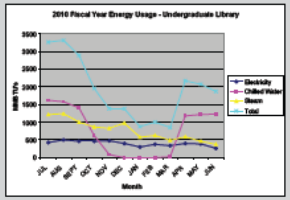
GRAINGER LIBRARY

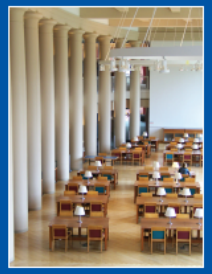


OAK STREET FACILITY



UNDERGRADUATE LIBRARY





UNIVERSITY OF ILLINOIS LIBRARY

The University of Illinois at Urbana-Champaign is the proud home of one of the largest and richest public research library collections in North America. Our 24 million items, the vast majority of which are paper and book-based, include Medieval manuscripts, large collections of incunabula and early printed books, literary manuscripts, maps and atlases, prints, and all sizes and types of printed books and other paper objects. The University Library is committed to sustaining and enhancing its capacity to treat and protect its important paper-based collections, with the majority of conservation and preservation-related investments focused on the care of its rare, unique, and otherwise valuable objects.

ENERGY SAVING ACTIVITIES & PROJECTS

- **Automatic Computer Shut Down Process**

  Designed by in-house professionals, the library has an automated system which shuts down staff workstations at the end of the day and restarts them in the mornings.

- **Reduction in the Number of Printers**

  Consolidated printers in centrally located areas rather than having individual printers at workstations. Replaced printers with multifunctional machines which print, copy, fax and scan in order to reduce the amount of office equipment.

- **Upgraded Monitors for Efficiency**

  Older CRT (cathode ray tube) monitors were replaced with more energy efficient Flat/LCD (liquid crystal display) monitors. The library has been purchasing ENERGY STAR rated computers and monitors.

- **Protecting Against Heat Loss**

  New perforated blinds have been installed on windows to help with heat transfer causing energy loss.

- **Utilizing Campus Surplus**

  The library is reusing more by searching Campus Surplus for needed items such as equipment and furniture before buying new.

- **Increasing System Efficiency**

  The Undergrad Library and the ACES Library were visited by the F&S Retrocommissioning Team to increase the efficiency of the buildings and to reduce energy consumption. Occupancy schedules were implemented, repairs made to sensors, and boxes and coils were commissioned.

- **Reusing and Recycling Volumes**

  The University Library turns over discarded, damaged and outdated volumes to the Better World Books program which resells or recycles them. A portion of the proceeds benefit literacy programs.

- **Reducing the Footprint**

  From reducing and vacating space to the use of compact, high-density shelving, the Library is reducing their footprint on the campus. With an iCAP goal of "no net increase in space" by 2012, the Library is making a difference by better usage of their space and resources.

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

LIBRARY TIPS

- Avoid using automatic doors, except when necessary. They allow more conditioned air to escape which wastes energy.
- Turn off lights in study rooms and restrooms when not occupied
- Recycle paper and other materials whenever possible
- Close shades in the summer and open them in the winter to conserve energy needed for heating and cooling
- Walk, Bike or take the bus to the library
- Think before you print. Save paper by proofreading on your screen before printing. Print double-sided when possible and only the pages that you need.
- Take the stairs instead of the elevator if possible

ENERGY USE POLICY

University of Illinois at Urbana-Champaign

Campus Energy Goals

I. 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.

II. 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.

Funding Options

- American Recovery and Reinvestment Act (ARRA)
- Energy Service Companies (ESCOs)
- Revolving Loan Fund
- Improved Fundraising efforts (U of I Foundation involvement)
- Academic Facilities Maintenance Fund Assessment (AFMFA)
- Student Sustainability Committee
- Energy Billing Savings
- Corporate Partnerships
- Public/Private Partnerships.

Possibilities

Create a revolving climate loan fund. A revolving loan fund is an effective way to initiate and sustain key components of the iCAP. A successful revolving loan fund will require initial capitalization, strategic loans, effective cost tracking, and verification to confirm projected cost savings and GHG reduction benefits are realized. The loan fund would provide capital for high-performance, energy efficient campus design, operations, maintenance, and occupant behavior projects.

Pursue grants that reduce GHG emissions. An area of specific interest is grant opportunities for implementing iCAP goals associated with building projects, and for reducing peak campus steam demand.

Faculty and staff green commitment. This fee would help the University achieve ambitious climate action goals and also give faculty and staff a sense of parity and shared commitment with students. Create an internal donations strategy and process for faculty and staff to contribute to the student green fee or centralized pool.

Possibilities

Develop an integrated donations strategy. Moving to a low GHG economy is swiftly emerging as the defining issue of this time. Donors will want to support iCAP efforts especially if they see the University taking a leadership role. Involving the U of I Foundation is essential to ensure clear messaging and a comprehensive, integrated approach. Furthermore, campus needs to establish a priority list of sustainability projects and assign a high-level liaison to support fundraising and implementation of such projects.

UI green marketing. Establishing the University as a leader in climate response and implementation has significant marketing value that should not be overlooked. Money follows good projects that are visible and easily understood. Sustainability is becoming a core value of the institution and continuing to build this reputation, supported by a good marketing program, is key to gaining financial support for this effort.

Questions?