Minutes for iWG meeting, September 18, 2017

Members present: Rob Fritz, Julia Chang, Sean Reeder, Larry Uphoff, Morgan White, Matthew Tomaszewski, Ximing Cai, *Micah Kenfield (ex officio)*

Guests present: Andrea Martinez, Karl Helmink, Paul Foote

1. Welcome to New Members
    a. Ximing Cai welcomed Julia Chang, from the Student Sustainability Committee, as a new member of the iCAP Working Group

2. SWATeam Updates
    a. There are now three paid student clerks working with the six SWATeams
    b. Six student representatives are returning, and six students are new this year.
    c. Nine faculty representatives are returning, and three faculty are new.
    d. Nine staff representatives are returning, and three staff are new.

3. Green Labs Program Update
   (brief notes from presentation are noted below – the full presentation is also available)
    a. Overview of Green Labs Concept
        i. Ximing provided a brief overview of the program as it stands now
        ii. Labs for research and education are an important part of campus
        iii. Current university administration of labs focuses on safety (Division of Research Safety, DRS in Office of the Vice Chancellor for Research)
        iv. More is needed to do beyond safety, including but not limited to energy and material saving, waste recycling, and space management
        v. Need to start from inventory development and move to the development of policies and guidelines and eventually the full implementation of a green labs program
        vi. A coordinator has been recommended and discussed; he/she is expected to provide investigation, communication over all levels, collaboration with lab managers and F&S, and monitoring, awareness spreading, policy and guideline development, etc.
        vii. Many peers have already started a green labs program coordinator
    b. History of SWATeam Recommendation and Assessment
        i. 2010 iCAP suggested repeating the Shut the Sash campaign
        ii. 2015 iCAP suggested “a Campus Fume Hood Efficiency Program”
        iii. Spring 2016 the ECBS SWATeam and Dr. Frances Kuo researched various programs--including another successful Shut the Sash trial--and F&S funded Paul Foote (as an Academic Hourly position) to start inventory process
        iv. Nov. 2016 ECBS submitted recommendation to iCAP Working Group iWG)
        v. Dec. 2016 iWG approved recommendation and sent to the Vice Chancellor for Research (VCR)

vi. May 2017 VCR agreed to discuss program
vii. Aug. 2017 iSEE, ECBS, and VCR reps met to discuss the program – Melanie Loots and Jan Novakofski met with Ximing, Micah, Morgan, Karl, and Paul, with Marian on the phone. VCR reps suggested people to talk with (eg. Associate Deans for Research), explained how Division of Research Safety works with labs now, considered potential reporting lines and scope, and needed personality/skills

c. Green Labs Best Practices From Peer Institutions
    i. Paul Foote, Micah Kenfield, and Karl Helmink reviewed a number of peer institutions.
    ii. Universities with well-established Green Labs Programs implementing multiple initiatives, campaigns & competitions which deliver measurable results, greater impact, savings and behavioral change by focusing on these key areas:
        1. Save Energy
        2. Reduce Waste
        3. Manage equipment program to maximize efficiency
        4. Conserve Resources
        5. Purchase Sustainably
        6. Create a Sustainable Lab Culture for a healthier campus

d. Open Issues for Discussion
    i. Sean – was there any discussion to the volume of greywater reused from Harvard? Paul – no on volume, but it was used significantly to water plants.
    ii. Ximing - we have time to answer additional questions as needed.
    iii. Morgan – we still need to figure out where it's going to be housed, what kind of funding it needs, and so on.
    iv. Matthew – spoke to Melanie Loots, and is passing along that we need to consider the differentiation of the labs. Some will be very much on board, others may be concerned that it disrupts their research. We need to be keeping an eye out for that.
        1. Morgan – in order for the PIs to be comfortable with the idea, we need someone with an understanding of the research process. This will be mandatory for whoever takes the role.
        2. Ximing – they also need to have excellent communication skills with an ability to relate back to all people
        3. Matthew – I agree, we just need to make sure researchers know we're not going to interfere with their problems.
    v. Location of position organizationally:
        1. F&S Safety and Compliance as well as the Division of Research Safety are very big on drop-ins and checking on compliance with things like chemical storage and chemical waste disposal.
        2. Morgan – this is very much checking to make sure people are following 'established rules.' We need to develop policies and guidelines along the way so everything leads to a positive situation

3. We don’t just decide to fund something long-term. In this case, we’ll need to have a pilot program for two to three years. This group will help decide what to do and then we’ll hire someone capable of it.
4. With multiple years of data in hand, this will give us an argument to fund the position on an ongoing basis.
5. This is also works well with our general image of “Safe and Sustainable.” This program needs to be one supported by the VCR to work toward making campus safer.
6. Sean – I’m not sure this has the same level of voice if it’s not in the VCR’s office.
7. Ximing – Melanie suggested this be situated in iSEE. In the past, VCR had an issue with a person that was a ‘department of one,’ and without a team/group it was a real area of concern.

vi. Morgan – another issue is funding. One major question is “does this position pay for itself.”
    1. When you decommission a fume hood or shut the sash, you’re saving energy which saves money.
    2. Not sure whether or not we can use the ‘savings’ from doing the project to pay for this position. When we mothball a fume hood, can we use some of the funding to pay for Paul’s time? As it stands, no.
    3. One option would be to split the position between a coordinator (who works on behavioral change) and an engineer. There are other options too though and we don’t have it worked out quite yet.
    4. One inherent aspect of the program is we’ll never have a clear visible payback from this program. Other options we could consider using something like the Carbon Credit Sales Funding. Both the head of F&S and the head of iSEE would need to sign off on it, but if we agreed it would be a good use of funds, we’d be allowed to use it.
    5. Sean – could we see if VCR is willing to match funds along the way? If we choose the buildings smartly, we can have strong data coming out of it to support a longer-term position.
vii. Next steps – draft a full description, put it in a draft proposal, share it with the VCR’s office, and move it along from there. It’s now in iSEE's hands to put together.

iCAP Working Group

Professor Ximing Cai
Associate Director for Campus Sustainability
Institute for Sustainability, Energy, and Environment
University of Illinois at Urbana-Champaign
September 18, 2017

ISEE

INSTITUTE FOR SUSTAINABILITY, ENERGY, AND ENVIRONMENT

Agenda

- Welcome to New Members
- SWATeam Updates
- Green Labs Program Update/Discussion
  - Overview of Green Labs Concept
  - History of SWATeam Recommendation and Assessment
  - Green Labs Best Practices From Peer Institutions
  - Open Issues for Discussion

Welcome to New Members

- John Dallesasse, Faculty Senate Representative
- Julia Chang, the Student Sustainability Committee Representative.
- An SSLC Representative will be identified at a later date.

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Sustainability Working Advisory Teams (SWATeams)

Energy Conservation & Building Standards

Energy Generation, Purchasing, & Distribution

Transportation

Purchasing, Waste, & Recycling

Water and Stormwater

Agriculture, Land Use, Food, and Sequestration

SWATeam Updates

- Three student clerks: each works with two SWATeams
- Student members: Six continuing members and six new
- Faculty members: Nine continuing members and three new
- Staff members: Nine continuing members and three new

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Overview of Green Labs Concept

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- Current university administration of labs focuses on safety (Division of Research Safety, DRS in Office of the Vice Chancellor for Research)
- More is needed to do beyond safety, including but not limited to energy and material saving, waste recycling, and space management
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History of SWATeam Recommendation

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Progress on Inventory

10 buildings, 560 fume hoods

- De-energized two exhaust fan (1800 cfm and 3000 cfm) units that were running 24/7
- Turned off 7 fume hoods that were only running because “they always ran”
- Turned off an empty walk-in refrigerator
- Closed countless sashes when not in use

Additional findings:

- 17 CAV hoods could be turned off, if they had switches added.
- Several (19) fume hoods were combined in groups – exhausting conditioned air unnecessarily when one of the group is being used for research experiments.
- Other HVAC inefficiencies – some mechanical and others user implemented, such as a sign on the sash saying to leave it on because it is acting as the room exhaust.

Energy Conservation efforts to date- Estimated Savings			
Action taken		Identified	
exhaust fans $/yr*	$2,700	Fume hoods *1	$ 34,000.00
Fume hoods **	$ 28,000.00	Combined Hoods*2	$ 57,000.00
walk-in freezer			
	$30,700	SubTotals	$ 91,000.00

*Electricity savings only, additional savings from reduced airflow and exhaust of conditioned air not calculated

**Fume hood dollars are estimated average of $4000 per hood; hood type has not been taken into consideration

*1 Assumes 50% reduction by adding switches to 17 hoods currently running 24/7

*2 calculates reduction @ lowest average of $3000 per hood times 19 identified hoods

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SUSTAINABILITY AT CALTECH

What Do University Websites Say to Do?

Johns Hopkins

- A fume hood consumes **3.5 times** the amount of energy consumed by the average house
- One simple action can make the difference between a wasteful lab and a responsible lab: **CLOSE THE SASH**!

Stanford University

- Fume hoods are big energy hogs because they use so much conditioned air. When the fume hoods are not in use but left open, a tremendous amount of energy is wasted by the conditioned air flowing through the hoods and out of the building.

Cal Tech

- **Shut your sash! -** A variable volume fume hood is 60% more energy effective when the sash is down when not in use
- One fume hood uses as much energy as 3 typical American homes

University of Notre Dame

- Keeping just one variable air volume hood closed when not in use rather than leaving it open all the time saves $1,000 a year and is equivalent to taking 3 cars off the road.

Pennsylvania State University

- With several hundred fume hoods at Penn State, we could save $250,000 to $500,000 in energy costs if the sashes are closed when the fume hoods are not being used.

BOSTON UNIVERSITY

Borrowed from Boston University Fume-Hood presentation

STANFORD UNIVERSITY

SUSTAINABILITY UNIVERSITY OF NOTRE DAME

PENNSTATE green.psu.edu Penn State is BLUE, WHITE, AND GREEN

Universities and Green Labs Initiatives

HARVARD UNIVERSITY

SUSTAINABLE STANFORD

Cornell University

GREENLAB.MIT.EDU

Environmental Center
UNIVERSITY OF COLORADO BOULDER

The University of Texas at Austin
Sustainability

UW GREEN LABORATORY

THE UNIVERSITY OF BRITISH COLUMBIA

MICHIGAN STATE UNIVERSITY

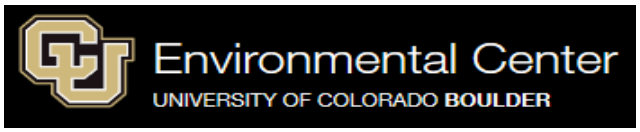
BOSTON UNIVERSITY

UNIVERSITY OF CALIFORNIA
UCRIVERSIDE

UCDAVIS
ENVIRONMENTAL STEWARDSHIP
AND SUSTAINABILITY

Benchmark Results

- Various levels of green labs programs/initiatives;
  - web information only
  - web and green labs certification process
  - green labs program with full time staff managing multiple initiatives
- Green Office/building Certification Program
- Green Labs Certification Program
- Green Labs Program multiple initiatives, campaigns & competitions with measurable results and outcomes



Universities with well established Green Labs Programs implementing multiple initiatives, campaigns & competitions which deliver measurable results, greater impact, savings and behavioral change by focusing on these key areas**:**

- Save Energy
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- Manage equipment program to maximize efficiency
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- Purchase Sustainably
- Create a Sustainable Lab Culture for a healthier campus

Harvard's Program

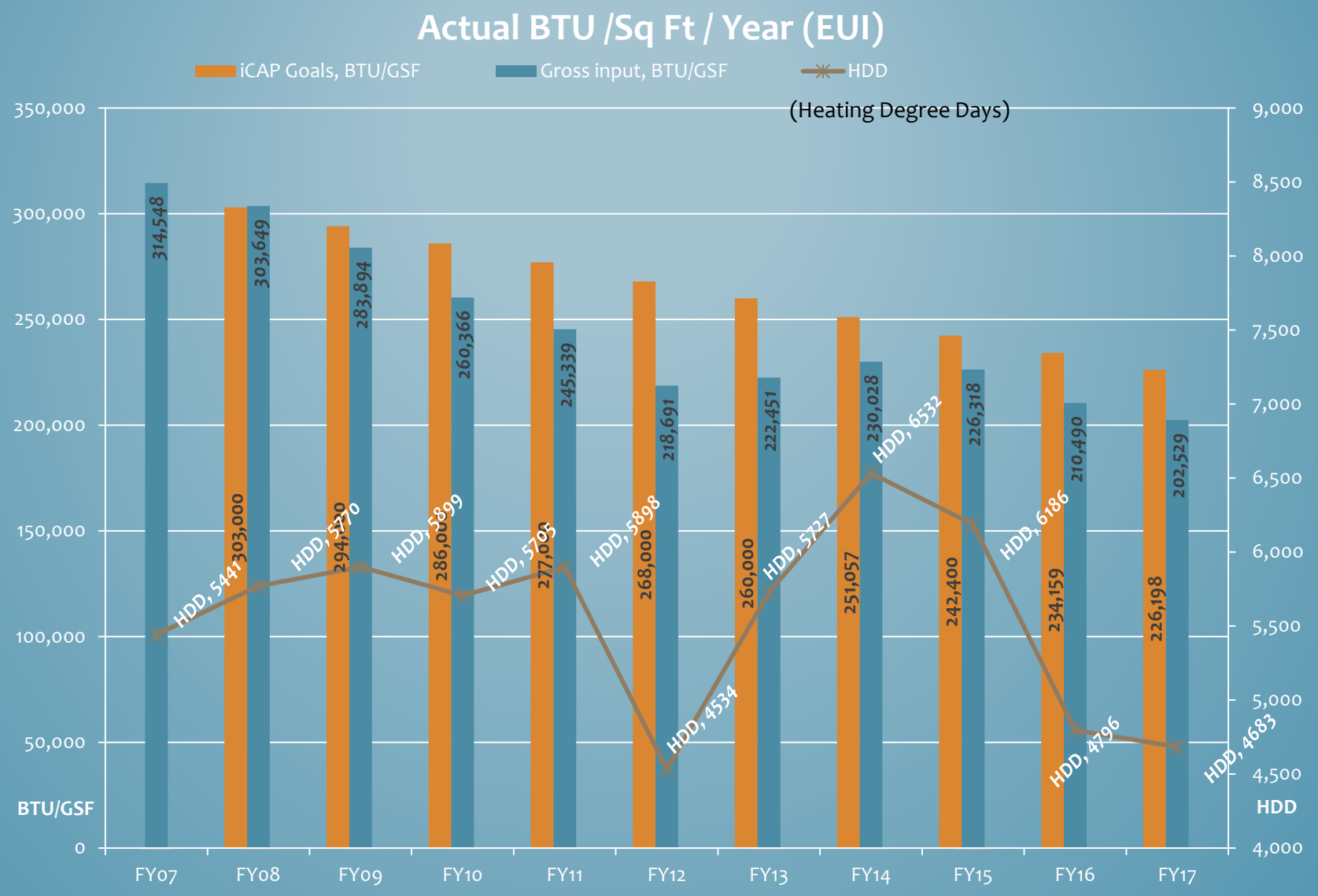
- **Maintain Shut the Sash Program development and upkeep-** in collaboration with faculty, staff and students.
- **Green Labs Certification Program-** Certify individual lab commitments to Green Lab practices
- **Lab Recycling Certification Option**- Instruct & certify lab personnel on proper recycling techniques and procedures to maximize waste management and recycling efforts in the lab community.
- **Preventative Maintenance programs for Ultra-Low freezers-** Institute 2 cleanings and 1 inspection per year, every year. *These efforts deliver a large reduction from several freezer failures per year, to one and even zero freezer failures in many departments, according to faculty and facility managers*.
- **Collaborate with departments to use/share backup freezers for maintenance-** defrosting, and sample organization, results in better sample storage methods, efficient space utilization from sharing, and more efficient operating & longer lasting freezers.
- **Water reduction, capturing, and recycling measures-** pilot program for waterless cooling condensers for overnight and lengthy experiments, repurpose cooling water from grow chambers to grounds for irrigation, transformed aquatic tank water to grey water use.
- **Space-use and classification evaluation-** some space designated as lab did not require outside air and was able to use a fan coil instead, reducing conditioned air requirements and increasing energy savings

Currently the Shut the Sash program saves $300,000 annually

Stanford's Program

- **Many of the same efforts as Harvard, different organizationally**
- **Centralized through Office of Sustainability, Partner with other departments –** works with staff from Facilities and Services / Division of Research Safety. Technical work is largely handled by other units.
- **Dedicated Module in *My Cardinal Green* –** Stanford has a campus-wide sustainability assessment and education tool, with an automated module for labs to see 'easy wins' for their sustainability efforts. For many labs this is all the support they need, though the coordinator follows up upon request for individualized assistance or referrals to other units.
- **Significant outreach component –** Green Labs Coordinator and her staff table at university events, speak at departmental meetings, and work to continuously identify new avenues for outreach.
- **"Peer Pressure" / referral program –** targeting postdocs and research assistants to push research faculty toward greener efforts.

ENERGY USAGE TREND



FY17 Top 25 Energy Consuming Bldgs

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

2017 Energy Consumption Report- Top 175 Buildin

Total Energy (MMBTU)	Average EUI (BTU/SQFT/YR)	Total Cost ($)
3,373,448.8	187,451	$ 63,276,240.09

FY17

Utility Costs used- Fully Loaded Rate
Electricity - $0.089/ kwh
Chilled Water - $15.48/ MBTU
Steam - $19.37/ klb
Gas - $0.0495/ therm
*Only the top 175 buildings are included in the totals.
Petascale is excluded

BID	Building Name	Rank	Total MBTU	Cummulative MBTU	% of Cummulative Energy	Total GSF	Energy Utilitization Ind	Utility Cost ($)
0116	Roger Adams Laboratory	1	110,751.6	110,751.6	1.60%	268,297	412,795	2,180,242.0
0228	Beckman Institute	2	110,032.6	220,784.2	3.20%	357,600	307,697	2,141,823.9
0070	Chemical & Life Sciences Laboratory	3	106,749.0	327,533.2	4.75%	231,316	461,486	2,074,976.0
0237	Micro and Nanotechnology Laboratory	4	104,544.0	432,077.2	6.26%	147,347	709,509	1,977,368.9
1080	Institute for Genomic Biology	5	86,913.4	518,990.6	7.52%	219,789	395,440	1,731,971.7
0292	Veterinary Teaching Hospital	6	71,129.0	590,119.6	8.55%	233,703	304,356	1,350,950.7
0336	Madigan Laboratory, Edward R	7	68,850.0	658,969.6	9.55%	171,007	402,615	1,342,077.7
0138	Burrill Hall	8	65,912.7	724,882.3	10.50%	171,832	383,588	1,262,296.9
0118	Activities & Recreation Center	9	65,895.0	790,777.3	11.46%	442,235	149,004	1,259,595.5
0023	Illini Union	10	65,276.0	856,053.3	12.41%	305,130	213,928	1,211,816.5
0066	Seitz Materials Research Lab	11	63,120.0	919,173.3	13.32%	123,151	512,542	1,204,452.6
0350	Vet Med Basic Sciences Building	12	61,962.0	981,135.3	14.22%	259,413	238,855	1,193,167.7
0242	Morrill Hall	13	61,101.0	1,042,236.3	15.10%	170,210	358,974	1,141,799.3
0041	Library	14	53,080.0	1,095,316.3	15.87%	562,532	94,359	969,204.7
0072	Memorial Stadium	15	51,077.2	1,146,393.5	16.61%	771,828	66,177	1,046,095.2
0052	Krannert Center for Performing Arts	16	47,409.0	1,193,802.5	17.30%	499,644	94,886	908,387.8
0166	State Farm Center	17	42,788.0	1,236,590.5	17.92%	315,821	135,482	854,606.8
0076	Psychology Laboratory	18	42,452.2	1,279,042.7	18.54%	154,523	274,731	776,481.0
0024	Newmark Civil Engineering Building	19	42,222.6	1,321,265.3	19.15%	208,959	202,062	874,666.2
0210	Digital Computer Laboratory	20	41,316.6	1,362,581.9	19.75%	194,280	212,665	803,619.6
0012	Noyes Laboratory of Chemistry	21	40,678.2	1,403,260.1	20.34%	184,711	220,226	865,401.4
0067	Loomis Laboratory of Physics	22	38,693.7	1,441,953.8	20.90%	175,513	220,461	741,428.5
0174	Engineering Sciences Building	23	37,927.2	1,479,881.0	21.45%	107,724	352,078	709,155.9
0197	Turner Hall	24	37,372.5	1,517,253.5	21.99%	180,003	207,622	726,839.4
0275	Food Service Building - ISRH	25	36,907.0	1,554,160.5	22.52%	48,015	768,656	715,298.2

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Open Discussion / Questions

Green Lab articles and Green Chemistry organizations

- http://www.labconscious.com/ A Community Of Researchers Reducing The Environmental Footprint
- http://www.labconscious.com/blog/2015/11/20/5-tips-to-maximize-your-shut-the-sash-program 5 tips to maximize your shut-the-sash program Harvard Green Labs
- https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/12-principles-of-green-chemistry.html 12 principles of green chemistry- ACS.org, American Chemical Society
- https://bcgc.berkeley.edu/ Berkeley Center for Green Chemistry
- https://greenlab.mit.edu/resources MIT Green Labs
- http://www.mygreenlab.org/about-us.html