SWATeam Recommendation

Name of SWATeam: Energy Conservation and Building Standards

SWATeam Chair: Marian Huhman Date Submitted to iSEE: November 27, 2017

Specific Actions/Policy Recommended (a few sentences): **Energy Conservation Funding (New in 2017)**

We recommend the following actions and funds to implement critical projects key to energy conservation efforts at UIUC. Total funds needed: $3.55M

1) **RESTORE** funding of ~ $1.5M in FY19, compensating for loss of DCEO grants (Department of Commerce and Economic Opportunity), to continue the **Retro-commissioning (RCx)** work. Retro-commissioning = Identifying and implementing operational and maintenance improvements to existing buildings (first pass) to ensure continued optimal performance over time.

2) **INCREASE** the **Recommissioning (REx)** and **Preventive Maintenance (PM) teams**. Re-commissioning = Building operating and maintenance systems are examined, parts may be fixed or replaced, and systems reset as if they were being installed new. REx is usually performed about 5 years after RCx has passed thru a building and reoccurs about every 5 years going forward. **Preventive Maintenance** = actions to preserve life of equipment and prevent breakdowns (cleaning of coils, review of air handling unit systems, review of hydronic systems.) Occurs before re-commissioning. The PM group reports to the maintenance side of the organization whereas the RCx and REx teams report to Utilities and Energy Services. In terms of priority:

   - Change the 5th recommissioning team that is temporary for FY18 to make it permanent in FY19 ($350K/year)
   - Increase Building Maintenance and Preventive Maintenance teams from 1 to 2 for FY19. ($ 350K for 2nd team)
   - Implement systematic building control upgrades to enhance further energy conservation and/or replace outdated equipment (IT audit item) ($1M/year).
   - Increase Recommissioning teams from 5 to 6 for FY2019 ($350K for 6th team).

Rationale for Recommendation (a few sentences):

1) Restoring funding so that RCx teams can continue their work is critical because if we neglect systems and don't provide sufficient maintenance funding, our realized savings **will *regress* and we will spend *more*. Accrued RCx savings is over $48 million since FY 08.** Still averaging approx. 27% energy reduction in buildings and payback rates of 2-5 years.

   The loss of the DCEO grants is an unanticipated blow to energy conservation on our campus and those funds need to be restored. The highly skilled composite crews' RCx work has avoided costly breakdowns. Energy efficiency upgrades have saved the University millions of dollars in utility bills. Comparing FY07 to FY15, the campus reduced energy costs by $8M per year. Through conservation and retro-commissioning efforts, the university has successfully reduced the energy consumption per square footage from 314 to 202 kBtu/SqFt/year between 2007 and 2017. RCx work is needed on new projects as they are delivered. History has indicated that energy optimization is needed and Commissioning requires assistance on new projects.

2) Increasing the REx and PM teams is essential to strengthening conservation efforts in building systems. With the current REx and PM teams it will take about 10 years to get through assigned buildings, far longer than the established 5 years required to maintain the systems and cost savings. Growing the PM teams will increase square footage coverage and decrease the number of years buildings go without preventive maintenance. Unintended consequences of inadequate funding could include:
   - Decreases in efficiency of HVAC systems, which leads to higher, unpredictable energy usage;
   - Planned work gets deferred or cancelled, reducing productivity. Campus deferred maintenance backlog is currently **~$720M.**
   - Uncomfortable temperature and humidity conditions; impact conferences, meetings, etc.

Energy consumption at the University of Illinois is down ~33% since FY 07. We have made great gains in this area. Maintaining the actions that are saving us energy is essential to continuing to reduce costs and is critical to meeting iCAP goals. It is more difficult to recover these gains in the future if we do not adequately fund them now.

Connection to iCAP Goals (a few sentences):

The iCAP highlights energy conservation as a main category and this recommendation addresses the following iCAP objectives:

Energy Conservation and Building Standards objectives:

- "Strengthen centralized conservation efforts focusing on building systems to achieve a 40% reduction in total campus building energy use by FY30."

By not meeting the priorities set out in this recommendation, the University will be ***weakening*** campus conservation efforts despite these efforts contributing to a reduction of ~33% in energy consumption.

Perceived Challenges (a few sentences):

Energy conservation initiatives are seen as a way to decrease costs given the discretionary nature of conservation programs. The challenge will be allocating sufficient funding during an austere time to support a critical, but not necessarily an immediate, cost savings set of programs. Also, convincing decision makers of the need to spend now to save later is always a challenge.

Suggested unit/department to address implementation: Office of the Provost

Anticipated level of budget and/or policy impact: **High** (continued funding and development of campus conservation programs).

Individual comments are required from each SWATeam member (can be brief, if member fully agrees):

Team Member Name	Team Member's Comments
Marian Huhman	Covering the loss of the DCEO grants and increasing the teams for both RCx, recommissioning and building maintenance are essential to the continuing to meet the iCAP objectives for energy conservation. We do not want to regress!
Yun Kyu Yi	The older buildings sustain because of proper Recommissioning (REx) and Preventive Maintenance (PM), like HVAC and or pipes that exceed their expected lifetime, these should be replaced and if not this will not only damage the quality of space but also the buildings' structural integrity. Poor maintenance of buildings could cause a need for them to be demolished earlier and a new one to be built. In the long run, a poorly maintained building will use more energy and budget compared to properly maintaining the building.
Karl Helmink	Significant energy cost reduction has occurred since FY08. Replacement funding in FY 19 is needed for the lost DCEO grants. More advisable energy cost reductions can be achieved if funding can be allocated."
Dave Boehm	I approve. A comment: These are the minimum measures necessary to assure we meet our commitment to the iCAP objectives.
Andrea Martinez Gonzalez	This is a holistic approach to promoting energy conservation that creates systemic efficiencies by addressing the funds and staffing necessary to continue to achieve increasing energy savings.
Swarnali Sanyal	I approve of the proposal.

Comments from Consultation Group (if any; these can be anonymous): From Paul Foote: Founder and current Director of EcoOlympics, UIUC's campus housing energy conservation competition focused on creating behavioral change through student led events that engage, educate, and motivate the campus community.

Behavioral change that promotes a student led culture where energy conservation becomes the norm is challenging without properly working, efficient and up to date mechanical systems in campus buildings. We put a lot of energy into creating awareness and behavioral change by using student led marketing events throughout campus residence halls. When these efforts are not realized and have a minimal or even negative measurable result due to inefficient or out of date building systems, the impact of our efforts is tremendously reduced, which affects how the student participants view their efforts in relation to energy conservation in general.

Updating system controls, proper maintenance, retro-commissioning and recommissioning of campus buildings would significantly improve the building operations and results of the student competition efforts.

Explanation and Background (can be supplied in an attachment):

The recommendation put forward emphasizes the importance of funding energy conservation efforts that align with the commitments outlined in the iCAP. Compared to other Big Ten schools, the University's maintenance is underfunded and space use is not utilized as well as it should be. However, campus energy usage is similar to other Big Ten schools and has shown dramatic improvement since FY 07.
Even in these austere times, spending money to conserve energy means saving money in the long run. Other sources of funding are potentially available including Stewarding Excellence funds which could be used for these initiatives.

References: Kent Reifsteck's white paper (Utilities & Energy Services Budget) from March 2017.