iCAP Working Group

October 2023 Meeting

Date: October 27, 2023
Time: 9am-10am CDT
Location: Teams

Attendees: *Jennifer Fraterrigo (co-chair), Morgan White (co-chair), Miriam Keep (clerk), Jamie Singson, Quinn Connolly, Abby McGuire, Sandy Yoo, Claire Sullivan, Carl Bernacchi, Jack Liong*

Meeting Notes:

1. **Introductions**
    - Morgan White: iWG Co-Chair, Associate Director for Sustainability at Facilities and Services, Liaison between F&S and iSEE, Interim Director of Capital Programs
    - Miriam Keep: Sustainability Programs Coordinator at iSEE and clerk for iWG
    - Quinn Connolly: Illinois Student Council Environmental Sustainability Committee Vice Chair
    - Jamie Singson: Director of Capital Planning and Space Management in Student Affairs
    - Carl Bernacchi, Professor of Plant Biology and Crop Sciences
    - Sandy Yoo: System Office, Capital Programs
    - Abby McGuire: Student Body President through ISC
    - Claire Sullivan: Student Sustainability Leadership Council
    - Jennifer Fraterrigo: iWG Co-Chair, Associate Director for Campus Sustainability with iSEE, Professor of Natural Resources and Environmental Sciences
2. **Review charge letter/restructuring of teams** (Jen)
    - Shift of asking teams to focus on vetting of issues on campus and identifying solutions to problems that have been identified, instead of focus on coming up with new recommendations

        - This is a response to challenges observed: Sometimes there isn't support on campus for recommendations, challenges with financial feasibility and budget. We need more engagement with all affected stakeholders and campus units to understand what the issues and barriers really are. We aren't telling teams not to write recommendations, but shifting emphasis to engaging with campus units and getting the full back story of whether a unit is really in a position to move forward with some of these initiatives. We heard from team members it's frustrating when recommendations don't move forward so we're trying to address that.

- Trying to provide guide rails for teams as far as areas to focus on. Trying to share knowledge and guidance with teams on how to focus their efforts.

- Feedback
    - Sandy: I think this I great; it will also cut down on us sending things back because they aren't fully baked. We often ask for more details on issues, how to fund it is always one of the primary ones, also finding which stakeholders it impacts. I think this goes to being a good neighbor, recognizing that changes impact other groups and the campus as a whole. I think this is a good direction.
        - Morgan: We are trying to get this team more informed and aware of how to move the needle; that's why today we will focus on Energy updates.
    - Jamie: I think it's a great idea, more efficient with everybody's time. It's frustrating to forward a recommendation and then find out the unit can't sustain it or there are other reasons their interest isn't high. We may have the opportunity to push stakeholders to be more cognizant on what they can do. I think it's also helpful for us to explain funding sources.
        - Jen: Want to see iWG take more of an advisory role. So before we see the recommendation we are assessing, we can assist teams in identifying stakeholders that need to be brought to the table.
    - Sandy: Some recommendations weren't fully vetted but did spark an idea. It would be great to encourage groups to come to Jen, Miriam, Morgan to get a feeler when they have ideas to make sure they are fully vetted. Would be a shame to lose new ideas that come up.
    - Jamie: I appreciate Jen that in your emails you tie in to why ideas are linked to strategic plan.
        - Jen: we continue to face challenge to educate campus about the iCAP. Underpins work with units that don't understand what their role is in all this. We tried to bring this out in the charge letter, trying to get teams to communicate about what the goals are.
        - Jamie: iSEE and student groups are doing great work, somebody needs to hold us accountable.

- Abby: I think this is great and opens more routes for communication.
- Quinn: It's really great to connect with student groups and help move their projects forward.

3. **Overview of developments related to Energy** (Morgan)

   - **Abbott Power Plant:**
     - Cogen power plant that is part of UIUC infrastructure, belongs to campus, combines heat and power. Primarily creates steam, which goes into district steam system and heats majority of campus buildings. Before we send out steam we run it through turbines to get electricity. Requires burning fossil fuels, so there are lots of discussions about how to move this off fossil fuels.

     - District cooling is not at Abbott, 4-5 chiller plants around campus. Connected to pipes of cold water, using electricity for the majority of it. That goes into district cooling system. If you are in building with central air, probably on chilled water building. There are a few buildings that have cooling tower on the roof, or AC units. Chilled water system connected to our only large scale energy storage. It's a massive tank by the stadium, full of cold water. You can use chiller systems to chill water at night when electricity prices are low and then use it at day, this is called demand shift.

     - Steam is for heating, also running some machines. We typically get about half our power from Abbott. Before we signed climate agreement we got most of energy from the grid. Owned by private developer, controlled by MISO which is nonprofit facility that makes sure we don't have blackouts/brownouts. We buy through university system office.

   - **Other Energy**

     - Two solar farms and some rooftop solar, which produce some power for campus grid.

     - Wind agreement where we buy power from off campus for university grid.

     - Efforts to conserve energy: energy management control center watches for energy waste and addresses issues that arise

   - **Questions**

- Jen: Is it correct that Abbott used to be coal powered, and now mostly replaced by natural gas?
    - Morgan: yes, first we had coal and natural gas, then just natural gas, then we added coal to support local industry in 70s or 80s. With climate commitment, we shifted to emphasize natural gas. There was a utilities energy master plan looking at how long existing coal and natural gas boilers will last and redundancy required to maintain capacity. We are using larger and more efficient natural gas boilers, but these haven't replaced coal boilers. Existing coal boilers will last 25-30 years.
    - Notable drop in coal use over the past 15 years. Chancellor made commitment to not burn coal in the summer. Some research done on carbon capture at coal boilers, at one point we increased use of coal to do that research with prairie research institute. Coal prices went up at same time natural gas prices went down: decision to use more natural gas was also the cheaper decision.

- **Overview of energy sources in FY21**
    - Total energy use is 1,285,133 MWh, of which 39,688 came from clean energy sources. Vast majority comes from natural gas, followed by electricity generated and wind power purchased, remainder purchased from the grid. A small amount from biomass boiler and solar thermal energy.
        - Note: Power is a subset of Energy
- **2015 utilities production and distribution master plan**
    - Continuing work to get more renewables, support cogen at Abbott, energy conservation, limit growth
    - Comparing actual annual energy use to iCAP goals, we've surpassed our goals so far. Strong downward curve in energy use. Focus on energy conservation so we can use money saved to invest in clean power.
- **Energy reduction initiatives**
    - Retrocomissioning: reached over 80 buildings, saved ~25% of energy in each building, takes about 6 months per building
        - Invested $18M and saved over $70M from FY07 to FY20
    - Recommissioning: work to maintain energy savings, such as maintaining air ducts

        - Energy performance contracting: work with companies that reduce energy costs, we only have to pay them what they save in energy.
        - Supply side enhancements.
        - Energy use intensity has gone down. This is energy divided by square footage. Looking at total energy consumption for certain bounded areas, it's been the same because we have new buildings, new equipment that use a lot of energy. It will be interesting to compare results after FY18 without supercomputer. Some buildings are net zero because they create solar energy, but they still use energy from Abbott.
        - Nuclear could potentially provide some energy, and we will talk about this more next time. Something like $500M for one nuclear microreactor, but we would buy it with a supplier and DOE, so university portion would be less than $100M. Could provide about 12% of energy.
        - The energy dashboard on the iCAP portal, currently being updated, reports energy use per building. We need to make it known across campus this tool is available and raise awareness about energy reduction efforts.
        - Energy performance vs. facility condition index shows that we need to pay attention to both facility condition and energy consumption from that building.
    - Had to skip over slides on solar energy and space. After we go through slides during the next meeting, we can add them to the shared iWG Teams folder.
    - Lots of work going on in Energy. Important for iWG to understand questions like why we can't immediately switch to all renewable energy.
    - **Questions:**
        - Jen: thinking about retrocommissioning, it will be important to use data to pinpoint opportunities. To what extent is there digital twin data available to target places where we can have the biggest impact?
            - Morgan: conceptually we have parts of that. Energy management control center identifies when something goes wrong at a building. Calls about temperature go there too. Associate director of F&S runs recommissioning teams to analyze which buildings have the most calls and those would be priorities for recommissioning. On retrocommissioning we are going down list of worst energy users on campus, for a while we couldn't go to auxiliaries, now we are working with auxiliaries.
            - Jen: so far we are at building scale, what about variation within buildings?

        - Morgan: The model for retro and re commissioning is to focus on the whole building. We do have preventive maintenance and deferred maintenance, which is based on systems, e.g. electrical system in a given building. This is from staff knowledge rather than digital data.
        - Sandy: my understanding is we are trying to collect data by zone.
    - Jamie: will facilities audit help with data on that last slide?
        - Morgan: this will help us learn about the condition of facilities. We will have a new report of the deferred maintenance backlog, good update on the situation so we can be strategic about addressing backlog. A task force at the system level will help us decide how to address it.
        - Sandy: important to emphasize repurposing and salvaging older buildings over building new buildings.
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