SWATeam Recommendation

Name of SWATeam: Energy Generation, Purchasing, and Distribution

SWATeam Chair: Yu-Feng Lin   Date Submitted to iSEE: May 27, 2019

Specific Actions/Policy Recommended (a few sentences): Develop a policy for the consideration of geothermal energy systems in all new or retrocommissioned buildings on UIUC campus.

Rationale for Recommendation (a few sentences): Because UIUC campus has achieved most goals for generating energy from solar and wind applications, future carbon offsets will be met by implementing other low-carbon renewable energy technologies. One such technology is geothermal energy. The development of geothermal systems on the UIUC campus is bolstered by several factors, including:
- Wide temperature range of the Midwest US climate (cold winter/hot summers)
- Favorable local geology and drilling conditions
- Potential feasibility of technologies for direct use heating and cooling and underground thermal storage
- Ambitious new building and retrocomissioning programs for next 10 years
- Existing research capabilities to support advanced system designs and effective operation.

Geothermal systems could also be integrated with biomass energy and high-performance energy systems in buildings.

Connection to iCAP Goals (a few sentences): The 1st objective in the Energy Generation, Purchasing, and Distribution chapter of the iCAP reads, "Explore Options for 100% Clean Campus Energy." This recommendation is in line with this objective.

Perceived Challenges (a few sentences): Since existing geothermal technologies in the Midwest US are not used to directly generate electricity, our SWATeam will collaborate with the Energy Conservation and Building Standards SWATeam. This collaboration will require extensive teamwork and cooperation, but we do not perceive any substantial challenges because the adoption of geothermal energy will help both SWATeams to achieve their goals. Furthermore, the technology will increase the operational efficiency of buildings and in the process reduce the overall energy required (either self-generated or purchased) for heating and cooling on campus.

The inclusion of geothermal energy may require the campus and Facilities & Services (F&S) to revise the building standards and procedures in project construction. This change in approach will likely pose some challenges, but we will educate each other on how and if to incorporate geothermal energy in building designs.

Suggested unit/department to address implementation: F&S and other units that are overseeing the construction of new buildings or retrocomissioning of existing structures will work closely and with researchers at the University of Illinois at Urbana-Champaign in developing the policy.

Anticipated level of budget and/or policy impact (low, medium, high): High policy impact. This recommendation would require UIUC Capital Planning and Retrocommissioning to consider geothermal systems in all building construction and renovations. The budget impact is expected to be medium to low. It is likely that geothermal systems would result in higher up-front construction costs, but would result in lower operating costs over the life of the system. The life-cycle cost should be one of the factors considered when considering the application of geothermal energy.

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

Team Member Name	Team Member's Comments
Yu-Feng Lin	As proposed above.
Andrew Stumpf	Fully agree. No other comments.
Mike Larson	I agree with this recommendation. I would suggest that our recommendation to hire a consultant be pursued first, as the information from that evaluation would include policy change recommendations regarding all new and retro-commissioned building.
Tim Mies	Fully support these recommendations without further comments.
Jonah Messinger	Agree. No other comments.
Gabriel Mishaan	Fully agree. No other comments.

Comments from Consultation Group (if any; these can be anonymous): None

Explanation and Background (can be supplied in an attachment): None