iCAP Energy Team

November Meeting Agenda

11/4/2022 2:00 P.M. – 3:00 P.M.

Zoom

- Introduction
  - Members Present
    - Tyler Swanson
    - Aman Mehta
    - Martha Kubakh
    - Robert Roman
    - Andrew Stumpf
    - Paul Foote
    - Jennifer Fraterrigo
    - Mike Larson
    - Roman Makhnenko
    - Shannon Anderson
    - Timothy Mies
    - Yun Kyu Yi
- Discussion of Clean Energy Plan Scenarios
  - Aman & Martha
    - Construct Solar Farm 3.0
    - Build Wind
    - Improve Energy Efficiency in Buildings
    - Construct CCS on campus
      - Discussion
        - Rob asks to check F&S website, UMS looks at expenses and planning associated with the various energy efficiency plans. Check theF&S energy management plan
  - Shannon

- Include Micro-Nuclear Reactor
- Paul
  - We need new technology we are not yet privy to and need to factor that into the mix with planning, it is not easy to replace the existing carbon intensive energy infrastructure.
- Roman
  - In terms of CCS, Illinois has projects in Decatur, Southern Illinois, and Gibson City all funded through DOE Projects. Abbot has a carbon capture plan at Illinois. The question is how does Illinois participate, is it a research project or can it be expanded to a scale where it is a major conductor for campus
  - Regarding geothermal, we have had pilot projects, but can we upscale to the point it makes a significant impact on campus.
  - One other thing worth mentioning is the production of hydrogen from excess solar and wind power.
  - Big issue is getting past the pilot process to the implementation process on campus.
- Jennifer
  - A recommendation could be made to bring together the groups on campus who may have experience with scaling up clean energy technologies.
- Shannon
  - Combining Pauls and Roman's remarks, there is a funding effort to build hydrogen hubs, if we can collect ideas of what is being funded at the federal level and what are expertise is, we can contribute that to a plan.
- Roman
  - A lot of things DOE is looking at are things that are above what we need or outside of our expertise, but what is a good way to create a platform for geothermal or hydrogen research? This is something we should look at: invite someone once a month to iCAP meetings to speak on these emerging technologies. It is

important that we invite experts, not just people with general knowledge

- Robert
  - Morgan will be talking to Maddhu about the clean energy plan tomorrow.
- Martha
  - What is the feasibility of geothermal?
- Robert
  - Best person to talk about this is Andrew Stumpf
- Mike
  - Geothermal will work to a point as a heating exchange with the earth. It is possible, but it is a challenge in that balance is necessary. It can be effective in part on campus, but I don't personally believe it is the final solution for campus. Problem is that we need electricity to run a geothermal system, which right now is largely fossil-fueled.
- Andrew
  - I think with geothermal we need to talk about deep direct use where we are using warmer fluids 6,000-2,000 feet in the ground. At a scale we are looking at for campus these are the options we want to explore, and it requires fewer boreholes than the current landscape.
- Mike
  - Energy conservation/efficiency should be #1 on a clean energy planning list, as it is cost effective and achieves a wide range of issues. If iCAP Energy does a recommendation, energy efficiency should be kept on there. Right now part of the problem is that our energy demand is so high that solutions such as geothermal are cost prohibitive. F&S continues to request money for energy conservation.
- Paul
  - A research building uses 7-10 times as much energy compared to a usual office building. That is not to say we should shut

down research buildings, but that we should find ways to improve the efficiency of research spaces. Have there been any technologies that we have already written off?

- Mike
  - There isn't anything we have ruled out but certain things are more viable than others. Any options that exist are very expensive, which is why energy efficiency is so important. Energy conservation is the biggest return for what we implement. MMR is promising but is far out. Hydrogen is viable but is very expensive. Another solution is to create a biogas station off campus for use on campus. It is viable but is also a very expensive scenario. Solar is a part of the solution but due to the profile of solar we are about saturated with what we can do. Challenge is the intermittency of wind/solar, need a backup.
- Martha
  - When writing a recommendation, what should we push for regarding technology
- Mike
  - MMR is a good technology to push for, I have a contact who can speak. We have a huge expertise on nuclear, and can potentially become a hub for nuclear.
- Roman
  - For these microreactors, do we have enough to cool them down?
- Mike
  - That is probably a better question for Caleb Brooks. These newer reactors are designed in a way that is supposed to be "almost impossible" to meltdown. These newer reactors are designed to be as safe as possible.
- Roman
  - But there is still a problem with waste/
- Mike

        - The fuel cell will operate for 10 years before it is picked up, but a facility will be needed to store/recycle.
    - Robert
        - The nuclear reactor Mike is referring to is much different than what is being proposed for campus. The technology is very different compared to standard reactors. Once we get the storage solution worked out it will be a big help. We also need a method to store our electrical energy that is produced on campus. Once the storage solution is developed, we can expand the use of renewable energy. Finally, we need to figure out how to address the end of life of energy infrastructure.
    - Aman
        - Given the time scale of MMR, should we recommend that a consulting group explore other technologies.
    - Mike
        - We have to decide to draw a "footprint" to measure our carbon footprint. Will we only make UIUC carbon neutral, or will we make the region carbon neutral. We can buy RECS/Solar/etc. and be 'Carbon Neutral' but we run the risk of stressing the grid and increasing dependence on fossil fuels due to intermittency.
- Identification of campus experts on proposed Clean Energy Planning Scenarios
    - Who would be a good contact point for each of our proposed scenarios?
- Recommendation Discussion
    - Jennifer
        - One strategy with a workshop is to ask iSEE to form a committee to organize such an event. In a recommendation
    - Aman
        - Roman mentioned that there are projects that are funded but were not eventually realized. Should we develop a recommendation to conduct feasibility studies?
    - Roman

        - While these may not be continued, I mean we may not have the expertise to judge.
    - Paul
        - I encourage everyone to look outside of the university and find out what is happening. Don’t discount the industry leaders on these technologies as well.
- New business
- Adjournment