First Steps to Reducing Water Use on Campus

11/21/2010
Student Sustainability Committee
Campus

Dear Committee Members:

The UIUC campus is a significant user of water resources and a significant discharger to the Urbana-Champaign sanitary district . Misperceptions that water is cheap and plentiful drive water use that is both excessive in quantity and quality. An example of the latter is the use of highly purified water for urinal flushing , landscape irrigation, and the like; in other words a mismatch between needed and utilized water quality . The UIUC campus is no exception to such practices.

The Climate Action Plan (iCAP; http://sustainability.illinois.edu/climateactionplan.pdf) presented by Chancellor Easter in in May 2010 provides explicit targets for making the campus more sustainable on a number of fronts, including water. ***The stated goals with respect to water are to reduce potable water use by 20% by 2015; by 30% by 2020; and 40% by 2025***.

Envisioned strategies are to:

1) Commission an internal, student-assisted study to determine a detailed water use baseline, the "true cost of water," and the related emissions

2) Include "true cost of water" charges with the energy billing program.

3) Begin utilizing non-potable water, including untreated raw water, sump pump discharge, cooling wastewater, stormwater and graywater.

4) Connect the raw water system by 2020

This letter of inquiry is to determine your interest in supporting the following actions addressing strategies 1 and 3.

- The ISTC will lead a student-assisted effort aimed at determining the quantity of water used and the "true cost of water" in cooling towers/ large reverse osmosis (RO) plants at the UIUC.
- The ISTC will determine the quality of water currently discharged as "blow down" in select cooling towers/ RO plants to establish a rational basis for reuse in applications such as landscape irrigation.
- Draw up a list of potential uses for such water in applications such as irrigation, graywater use, etc. in conjunction with stakeholders
- Determine the need for treatment, if any, in above applications and prioritize application areas based on cost effectiveness

<u>Outcomes of Proposed Action</u>

- The proposed data collection effort will add an additional level of granularity to the CAP study findings on water use within campus (Figure 1)
- Determine level of treatment currently practiced at the larger cooling towers to estimate "true cost of water"

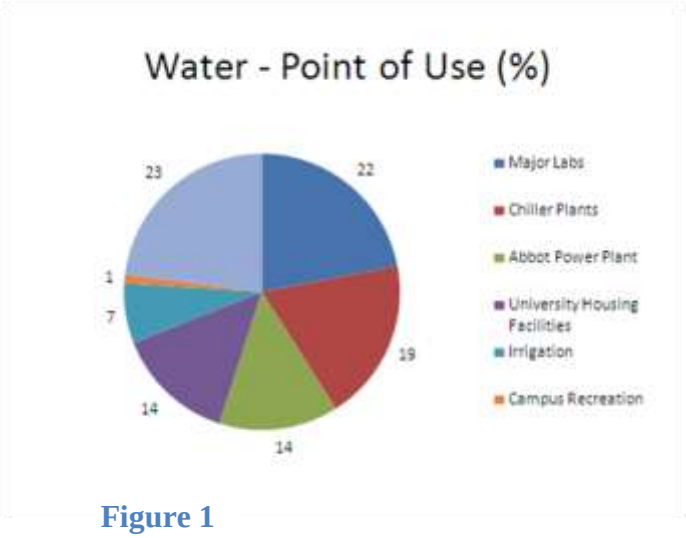

Figure 1

- Document the quality of effluents from cooling tower operations to allow envisioning alternative uses
- Provide a rational basis for rethinking such operations in terms of "heat integration", and system optimization for the longer term goals of 30 and 40% target reductions in water use

F&S Participation

Morgan Johnston- Sustainability Coordinator, F&S- has graciously agreed to represent F&S at this stage of the proposal process and has conveyed the strong interest of F&S in both participating and utilizing the results of this project in their planning process. The full proposal will address the roles and responsibilities of all participants.

Why Cooling Towers/RO Plants?

- Water used in cooling towers and RO plants are usually highly treated with chemicals to prevent operational problems. As such, they are also expensive to produce and discharge. It is not unusual to have water costs exceeding $4-6/kgal in these operations. Typically, the wastes from these operations are also expensive to discharge. Figure 2 is a summary of total water use and associated costs at the UIUC campus. It is clear that costs are going up and is expected o increase by another 50%. This leads to convergence of both economic and sustainability goals. This will be important to obtain buy-in from all concerned parties with respect to proposed operational changes.

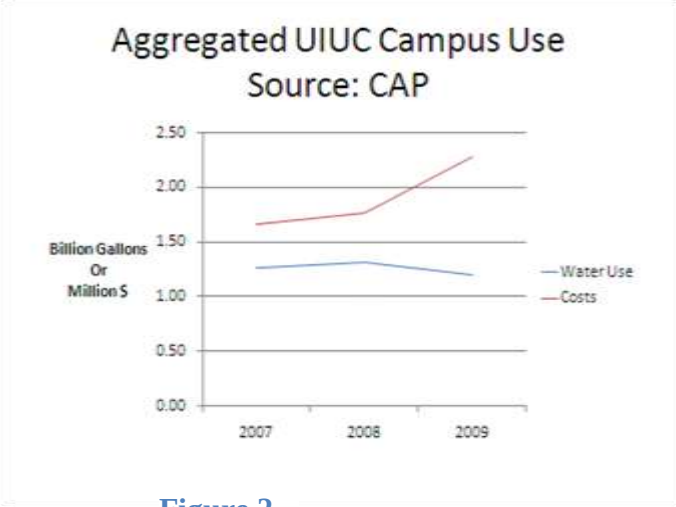

Figure 2

- Cooling towers and RO plant effluents represent large stationary sources- this makes both characterization and control easier to implement reducing costs
- Cooling towers and RO plant effluents represent about 30% (Figure2) of total water use. Effluents from these operations might represent 20% of water used totaling about 6% of overall water use on campus. If 50% capture and reuse can be achieved this will lead to 3% reuse on campus or 15% of target reductions for 2015. This will be a good first step in the short run but will shine the spotlight on the more important part of conservation – reducing heating loads going to evaporative cooling, or on using waste heat powered chillers.

Anticipated Budget: The anticipated budget for the above is approximately $10,000- this will cover costs of student help and analytical costs

Timeline: To be completed in six months from award (latest by Fall 2011)

Sincerely,

N. Rajagopalan,

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