**Learning Goals**

* Calculate indoor water demand of a building
* Quantify impact of conservation and technologies on indoor water demand

**Activity Overview**

Work in teams of 3. You will be using a spreadsheet to estimate the indoor daily water demand of the Civil and Materials Engineering (CME) Building on the University of Utah Campus, determining impact of water conversation practices on indoor water demand, and exploring the potential to achieve net zero water for the building. The CME building is 4 stories, has more than 40 individual offices, 6 office suites, and laboratory spaces. The building has approximately 80 occupants that are assigned there, with approximately 100 visitors and 30 students using the building each day. The building is in normal operation when the University is open. A few occupants are present on occasion when the University is closed.

**Part 1. Estimate Baseline Indoor Water Use**

***Time Limit:*** 10 minutes

***Directions:*** Use the LEED Indoor Water Use Reduction Calculator spreadsheet. After the instructor provides an overview, review the spreadsheets in the LEED Indoor Water Use Reduction Calculator with your team members. Ask questions to clarify points. Note that Tables 1, 2, and 4 are needed to set the baseline case and Tables 3 and 5 describe the improved design.

When ready or instructed to do so, enter the values as guided below (or by instructor) to estimate the “baseline” indoor water use for the CME building.

In Table 1 on the Group1 worksheet enter:

* Total Employees (FTE) = 80 (60 male, 20 female)
* Visitors = 100 (60 male, 40 female)
* Students = 30 (20 male, 10 female)
* Percent of males using restrooms with urinals = 100%
* Annual days of operation = 250

Note: when the cell is left blank it is the same as zero. And only the cells noted in this document need to be changed.

In Table 2 on the Group1 worksheet of the LEED Indoor Water Use Reduction Calculator, select “Yes” under “Included in Project” to include the three toilet types.

In Table 4 on the Group1 worksheet of the LEED Indoor Water Use Reduction Calculator, select “Yes” under “Included in Project” for Public lavatory (restroom) faucet. Leave the other fixtures marked “No”, since they are not included in this building.

The annual usages for this baseline case are calculated in Tables 2 and 4, and shown in worksheet “Summary D + C” of the LEED Indoor Water Use Reduction Calculator. In Part 3 below, you will divide the annual values by the fraction of days in each month to estimate monthly water use for the water budget/Net Zero Water analysis.

**Part 2. Reducing Indoor Water Demand**

***Time Limit:*** 10 minutes

***Directions:*** Specifyindoor water use reduction improvements and conservation measures. Consider the following options to specify in Tables 3 and 5 in the LEED Indoor Water Use Reduction Calculator spreadsheet:

* Toilets: Low-Flow 1.28 gallons per flush (gpf)
* Urinal: 0.125 gpf or waterless
* Bathroom faucet flows. Use of metering faucets that reduce flow to 0.25 gallons per minute (gpm)

Complete the design Tables 3 and 5 under Group1 worksheet of the LEED Indoor Water Use Reduction Calculator. After entering the values, check results in “Summary D + C” worksheet to see the impact of your design changes on water use reduction. Iterate a few times to identify ways to reduce water even further.

**Part 3. Evaluating Plan for Net Zero Water**

***Time Limit:*** 15 minutes

***Directions:*** Reviewthe NetZeroWaterCheck spreadsheet. Enter the following information:

* Annual indoor water demand for baseline and design case
* Outdoor water demand and other information is provided in spreadsheet

Evaluate building for potential to achieve Net Zero Water monthly and annually. Consider the following discussion questions individually and record draft responses and be prepared for discussion:

1. Do you have a water surplus at any time to use for outdoor watering during growing season? Would you need water storage?
2. Describe how to further improve the potential for Net Zero Water of the CME building.
3. Which months create a problem for net zero water for this building?
4. If the CME building were located in Atlanta, Georgia, how would the evaluation of net zero water have changed?