EFCAMPUS: WATER REDUCTION PLANNING

SPRING REVIEW MEETING

MAY 20, 2021
UCHICAGO AIMS TO REDUCE ITS WATER CONSUMPTION BY 15% BY 2025

Water Reduction Opportunity By Space Type (kgal and percentage)

- Classroom: 3,267 kgal (11.3%)
- Athletic: 3,152 kgal (7.0%)
- Student/Life services: 828 kgal (2.7%)
- Lab: 5,285 kgal (14.5%)
- Residence Hall: 6,810 kgal (14.5%)
- Plants/Service: 27,618 kgal (58.8%)
TO SUPPORT UCHICAGO’S WATER REDUCTION GOALS WE DRAFTED A FINANCIAL MODEL AND WATER REDUCTION PLAN

Financial Model

Model to assess important financial indicators of WCMs, including annual water cost avoidance, project cost, simple payback, net present value (NPV) and internal rate of return (IRR)

Water Reduction Plan

Plan detailing UChicago’s water reduction plan, including details on campus water consumption, benchmarking analysis, project list by WCM, financial impact of plan, and social cost of water
WE TOOK A DEEP DIVE INTO THREE BUILDING TYPES

Campus water usage by building type

Water use following water conservation measure implementation

Water consumption, FY17 vs post WCM implementation (Kgal)
### RESIDENCE HALLS

- Implement annual behavioral change competitions in all residence halls to motivate students to conserve water through reduced shower/sink times.
- Replace fixtures in all residence halls to updated efficiency standards.

<table>
<thead>
<tr>
<th>Water Conservation Measure</th>
<th>Water Savings / year (kgal)</th>
<th>Water Cost Savings / year ($)</th>
<th>Cost of Implementation ($)</th>
<th>Net Present Value ($)</th>
<th>Payback Period (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Change Competitions</td>
<td>739</td>
<td>$7,825</td>
<td>$4,404</td>
<td>$77,360</td>
<td>.6</td>
</tr>
<tr>
<td>Fixture Replacements</td>
<td>6,072</td>
<td>$64,181</td>
<td>$376,593</td>
<td>$311,991</td>
<td>5.8</td>
</tr>
</tbody>
</table>
B ATHLETIC FACILITIES

- Replace fixtures in Ratner Athletics Center and Henry Crown Fieldhouse to updated efficiency standards
- Install shower timers in Ratner to attempt to shorten length of showers by gym users
- Install new equipment/systems to reduce water consumption by washers in Ratner and Crown

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</thead>
<tbody>
<tr>
<td>Fixture Replacements</td>
<td>2,466</td>
<td>$28,790</td>
<td>$72,110</td>
<td>$200,238</td>
<td>2.7</td>
</tr>
<tr>
<td>Behavioral Changes</td>
<td>383</td>
<td>$4,052</td>
<td>$710</td>
<td>$41,610</td>
<td>.2</td>
</tr>
<tr>
<td>Laundry Waste-Water Recover</td>
<td>303</td>
<td>$3,200</td>
<td>$167,723</td>
<td>$53,431</td>
<td>7.9</td>
</tr>
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</table>
 Replace fixtures in student bathrooms of the following dining halls: Bartlett Dining Hall (C04), Campus North Dining Hall (C26), Campus South Dining Hall (H10).

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<tr>
<td>Fixture Replacements*</td>
<td>828</td>
<td>$8,745</td>
<td>$35,196</td>
<td>$56,202</td>
<td>4.0</td>
</tr>
</tbody>
</table>

*Note: following are estimates based on student knowledge. Further analysis needs to be done in this area to confirm values.

1. Note: This list of WCMs for Student Life & Services is not exhaustive; the team only focused on fixture replacements in this area.
There are several benefits of implementing the water reduction plan, including:

- **Meeting water reduction goals** through the successful completion of WCMs
- **Improving UChicago’s social impact**, as there are many hidden costs associated with water consumption
  - Includes non-carbon external effects of energy (primarily costs to health), carbon effects of energy (due to climate change), private costs (building, fueling, operating a plant)
- **Increasing student engagement** and pro-environmental behavior

### IMPACT OF PLAN

Water Conservation Measure by Building Type | Water Savings / year (kgal) | Water Cost Savings / year ($ / year) | Cost of Implementation ($) | Net Present Value ($) | Social Cost Impact ($ / year)¹
---|---|---|---|---|---
Residence Halls | 6,810 | $72,005 | $380,997 | $389,351 | $175,692
Athletic Facilities | 3,152 | $33,318 | $240,543 | $295,279 | $81,295
Student/Life Services² | 828 | $8,745 | $35,196 | $56,202 | $21,337
Total³ | 10,760 | $114,068 | $656,736 | $740,832 | $278,324

1. Social cost of water was used using sum of the energy social cost as well as the utility cost of energy
2. This list of WCMs for Student Life & Services is not exhaustive; the team only focused on fixture replacements in this area
3. Total is reflective of the total of residence halls, athletic facilities, and student/life services only
## TIMELINE

### 2021-2022 Academic Year

<table>
<thead>
<tr>
<th></th>
<th>Summer 2021</th>
<th>Fall 2021</th>
<th>Winter 2022</th>
<th>Summer 2022</th>
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<tbody>
<tr>
<td><strong>Prepare</strong></td>
<td>Residence hall behavioral change campaign</td>
<td>Implement behavioral change campaign for</td>
<td>Winter/Spring Break:</td>
<td>Fixture replacements in</td>
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<tr>
<td><strong>Prepare</strong></td>
<td>Athletics facilities behavioral change campaign</td>
<td>Athletic Facilities + Residence Halls</td>
<td>Fixture replacements for</td>
<td>Residence Halls and</td>
</tr>
<tr>
<td><strong>Summer 2021</strong></td>
<td></td>
<td></td>
<td>Athletic facilities</td>
<td>Student/Life Services</td>
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<tr>
<td><strong>Fall 2021</strong></td>
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