Design For America

- Campus Water Sustainability Solutions

Prepared for the Initiative for Sustainability and Energy at Northwestern University (ISEN)

October 31st 2010
Introduction:

Design For America is a student organization that uses design thinking to solve a variety of local social problems in the areas of health, education, and sustainability. Each quarter we place groups of students from all academic backgrounds in interdisciplinary teams to tackle different social challenges both on campus and in the Chicago land area.

In the Fall of 2009 two projects were launched focusing on water sustainability issues: How can we eliminate the use of disposable water bottles in our community? How can we reduce water consumption in our dining halls in a novel way?

Multiple teams were tasked with tackling these challenges, and by the end of the project two promising solutions had been uncovered. Below are results of these two pursuits:

PROJECT 1: Reducing Water Consumption in our Dining Halls

During the fall of 2009 in coordination with Sodexo, our group of students was allowed to conduct ethnographic research and observation in Northwestern dining halls in order to devise a way to reduce their water footprint in some way.

The group of students quickly observed that a large amount of water was used each day to clear food scraps off of student’s plates before they were even placed in the dishwasher. After conducting a quantitative study, we discovered that over 84,000 gallons of fresh water is used annually for this specific purpose.

Currently, the conveyor belts are flat and nothing prevents customers from leaving their plates full of food scraps. Based on simple affordances and human intuition, our team designed a method to retrofit circular conveyor belts with vertical dish washing racks which would instinctively prompt customers to clear their plates before placing them in the racks.
On March 11th 2010, Northwestern Dining and Sodexo permitted us to pilot this solution during a period of four hours from 10AM to 2PM, representing an average lunch period. Using the funds we were awarded by ISEN, we were able to purchase and manufacture 20 dish rack prototypes with which to fit the dining hall conveyor belt.

Below are two tables of the impact of our 4hour test, as well as projected water savings if our solution were to be implemented full time.

<table>
<thead>
<tr>
<th></th>
<th>10am - 2pm 3/4/10 (Without Right Angle)</th>
<th>10am - 2pm 3/11/10 (With Right Angle)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Time All Spray Guns Were Used (Minutes)</td>
<td>145.5</td>
<td>29.2</td>
<td></td>
</tr>
<tr>
<td>Amount of Water Used (Gallons)</td>
<td>174.6*</td>
<td>35.04*</td>
<td>*Based on a 1.2 gallon/min flow</td>
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<tr>
<td>Total Actual Savings 10am - 2pm (gallons):</td>
<td>139.56</td>
<td></td>
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<tr>
<td>Projected 8am - 8pm Daily Savings (gallons)</td>
<td>418.68</td>
<td></td>
</tr>
<tr>
<td>Projected Annual Savings (gallons)</td>
<td>83736</td>
<td>*Based on one dining hall operating 200 full days per year</td>
</tr>
<tr>
<td>Projected Annual Savings ($USD)</td>
<td>125.604</td>
<td>*Based on 1gallon=$0.0015</td>
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By adopting this solution, the dining hall stands to save approximately 84,000 gallons of water every year. The true potential impact however is that if Sodexo were to adopt this solution company-wide, the savings would be on the order of 400 Million gallons of water per year, in the US alone.

We are currently in discussion with Northwestern dining hall administration regarding piloting this solution for an extended amount of time at multiple dining halls on campus in order to demonstrate and conduct a more extensive study with regards to the true impact on water usage.
PROJECT 2: Reducing Disposable Water Bottle Usage on Campus

Inspired by over 160 bike share programs around the world, Bottle Share is a systemic approach to encourage the use of reusable water bottles. Similar to a public library, Bottle Share is open to anybody; it takes the form of a vending machine where one can check out reusable water bottles filled with cool fresh water, and return empty ones.

This solution eliminates the hassle of lugging around empty reusable water bottles, and raises the convenience of reusable bottles to that of disposable ones. Furthermore, because transportation costs and upkeep costs are minimal, checking out a reusable water bottle will be extremely price competitive with respect to the alternative disposable option.

Thanks to support from the Initiative for Sustainability and Energy at Northwestern, our students have put together initial prototypes and concept iterations. Currently however, Bottle Share is in stages of infancy: its founders have explored the product idea, but are looking for partners with whom to develop the infrastructure and implement the system as a business.

Exposure:

ISEN awarded Design For America funds to send three students to the Better World by Design conference organized by Brown University and the Rhode Island School of Design (RISD) in Providence RI in October 2010.

The conference was a great success and our two solutions focusing on water sustainability initiatives at Northwestern University, supported by ISEN, were extremely well received by both the student and professional communities. In particular, we have forged relationships with a group of students, a faculty advisor and a professional mentor, who have taken on the project of starting their own Design For America initiative at Brown + RISD.
Left: Dining Hall dish room with vertical stacking solution installed. (Mar 2010)

Below: From left to right Hannah Chung, Yuri Malina and Mert Iseri presenting their project to the Better World by Design Conference held by RISD/Brown University in Providence RI (Oct. 2010)

Above: Junior Hannah Chung explains the right angle concept to a conference attendee at the Better World by Design Conference in Providence RI