

Abstract

Bathing in Savings is a three-pronged approach to reducing energy consumption within residence halls at Rutgers University—New Brunswick.

An energy-efficient showerhead will be installed to reduce water usage, and consequent energy consumption. Educational posters taped to shower stall doors will inform residents of the environmental consequences of unnecessary water consumption. Additionally, the Resident Assistants will promote an energy-efficiency contest to encourage residents to lower their water usage.

After one year, water consumption data will be compared to historical data to determine the monetary benefit and water reduction of our program. If successful in energy conservation, the pilot program will be implemented in other residence halls at Rutgers University—New Brunswick.

Introduction

Energy consumption is a wide-ranging issue, particularly at large institutions like Rutgers—New Brunswick. Although cost is often a prohibitive factor to making environmentally driven changes, our plan is efficient and cost-effective, with a large return on investment.

- Showers account for ~17% of residential indoor water consumption (12 GPD/person)
- Annually, showers in the United States account for 1.2 trillion gallons of water

Water consumption is not regularly considered in the framework of energy consumption, so this program is a pioneered solution to energy consumption issues. By replacing existing showerheads with Niagara Conservation 2.0 GPM Chrome Handheld Massage Showerheads, and reducing overall water usage, energy consumption can be drastically reduced.

Analysis of 6 environmentally conscience showerheads resulted in the selection of the Niagara 2.0 showerhead. The Niagara 2.0 showerhead is maintenance free with a corrosion-resistant, high impact ABS thermoplastic body, and patented pressure-compensating technology. Customer reviews indicated that showerheads with a higher GPM are more effective for thicker, curly hair. The Niagara 2.0 GPM showerhead was selected to accommodate a wide range of hair types, considering Rutgers' diverse population.

CCF: centum cubic feet; GPD: gallons per day; GPM: gallons per minute

Bathing in Savings

Reducing Energy Consumption at Rutgers University

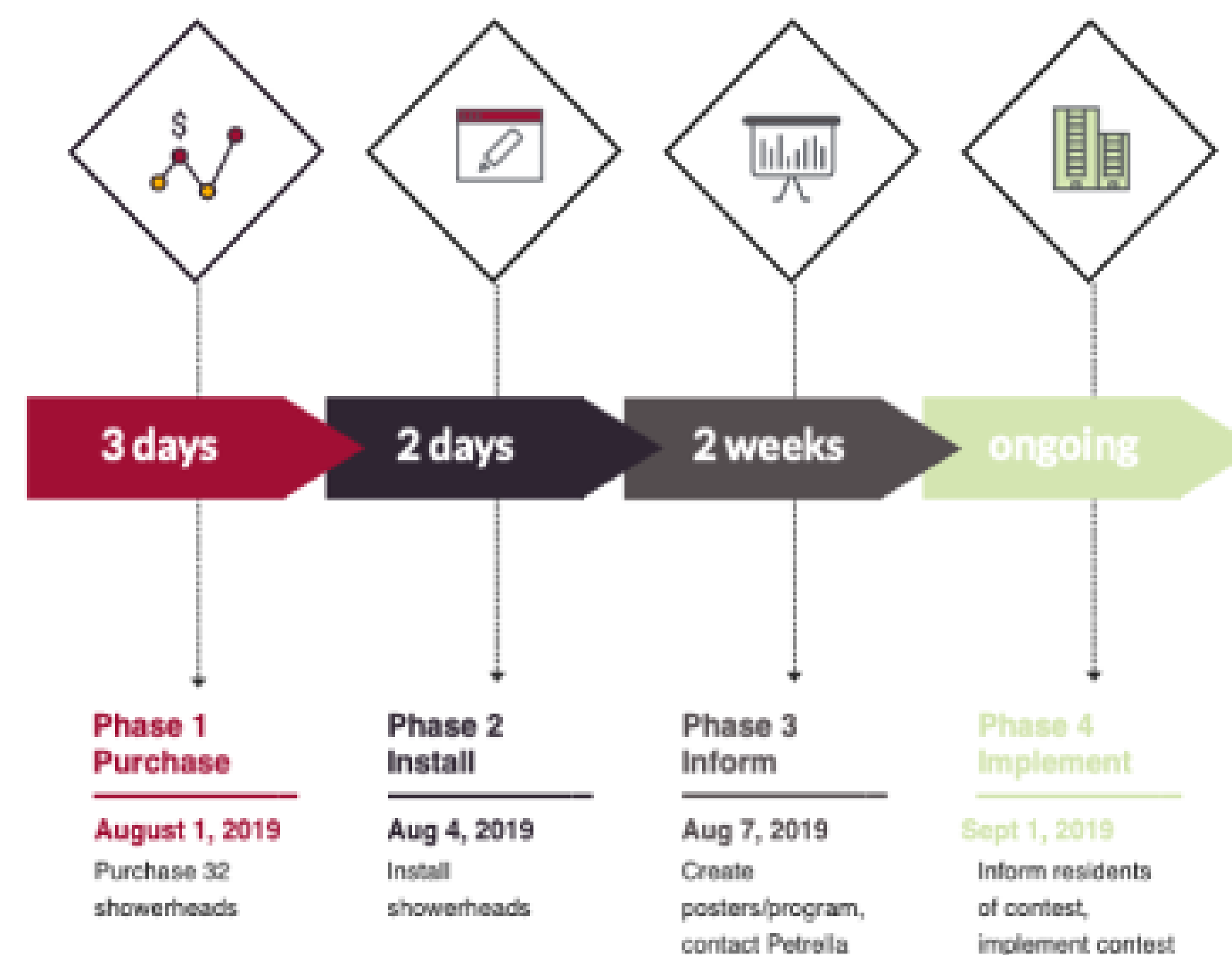
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Methods

- Piloting in Lippincott Residence Hall (Cook/Douglass)
- 1 CCF = \$4.86 (2018 Lippincott Residence Hall data)
- 32 showerheads cost: \$399.68
- Educational aspect: posters and Resident Assistants
- Incentivized contest: Drip Drop Contest

Table 1. Showerhead Comparison

Showerhead	Price	5-Star Reviews	# of Reviews
Niagara 1.25 GPM	\$9.99	62%	860
Niagara 2.0 GPM	\$12.49	71%	1,734
Peakman Hotel Anystream	\$33.99	80%	2,086
HYDRAO Aloe	\$78.99	-	-
HYDRAO Cereus	\$90.29	-	-
HYDRAO Yucca	\$111.87	-	-
Fyeer Valve	\$32.99	65%	26
Hiendure Valve	\$29.00	81%	16



Results

Table 2. Annual Savings

Month	Water savings (CCF)	Water Savings (\$)	Natural Gas Savings (\$)
June	85.91	\$417.53	\$25.52
July	97.10	\$471.91	\$21.73
August	81.08	\$394.05	\$26.65
Sept	97.83	\$475.46	\$37.49
October	99.76	\$484.84	\$267.37
November	73.58	\$357.62	\$510.40
December	66.96	\$325.42	\$557.54
Jan	74.40	\$361.57	\$520.51
Feb	69.88	\$339.63	\$511.48
March	69.18	\$336.20	\$341.12
April	130.35	\$633.52	\$207.61
May	36.84	\$179.03	\$23.88
Total	982.89*	\$4,776.79	\$3,051.31

*735,243.70 gal

Table 3. Cost-Benefit Analysis

Topic	Cost	Savings
Niagara 2.0 GPM showerhead	\$399.68	-
Posters/Contest	\$0	-
Annual Water	\$47,767.86	\$4,776.79
Annual Natural Gas	\$30,513.07	\$3,051.31

- \$77,881.25 saved in 1 residence hall after 10 years (10 year warranty) subtracting out cost of showerheads
 - \$47,767.86 saved in water bills
 - \$30,513.07 saved in natural gas bills
- Maintenance costs would be ~\$0 due to Niagara 2.0 design

Discussion

- The Niagara 2.0 was more cost-effective than the existing showerheads in Lippincott Residence Hall for both water and natural gas.
- The educational aspect with posters and the Drip Drop contest is of no cost to the University, as Residence Life already budgets for Resident Assistant-run programs.
- The Drip Drop Contest is predicted to increase monetary savings and environmental benefits beyond the projected savings, as the current projections only account for the reduction as a result of the Niagara 2.0.

Conclusion

- Monetary and energy savings from implementation of our plan far outweighs the purchasing and installing costs.
- Expansion of our project from 1 residence hall could result in astronomical savings across the five New Brunswick campuses.

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