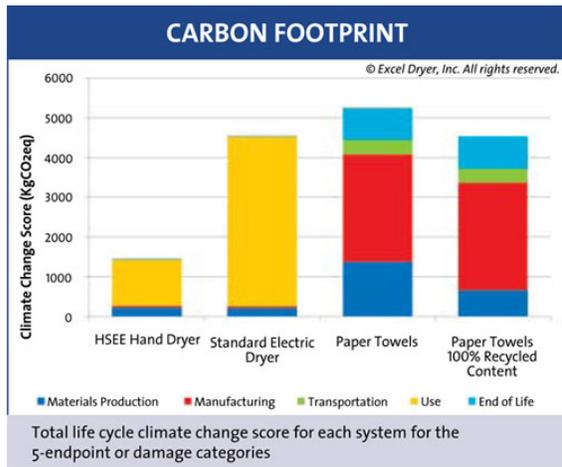


Introduction: Colby bathrooms and kitchens currently use paper towel drying systems. Current hand drying technology provides an alternative for the campus in order to reduce its waste volume and save money. Paper towel dispensers continually require rolls of paper towels, batteries (for automatic dispensers), trash bins, plastic bags, waste disposal, and labor to refill dispensers and dispose of waste. Each of these components generates greenhouse gas emissions, with 90% of the environmental



burden associated with the towels themselves and the other 10% associated with the paper towel packaging, dispensers, waste bins, and trash bags¹. According to the Continuing Education Center, high-speed, energy-efficient (HSEE) hand dryers have faster drying times, make cleaner restrooms, are cost effective, and are easy to retrofit². As shown to the left, the carbon footprint of HSEE hand dryers is significantly lower than paper towels by a factor of 4². Additionally, the average noise level of HSEE hand dryers is comparable to a standard toilet flush (75 dB) or shower (70 dB). Once electric hand dryers are installed, they require little to no maintenance and have significant cost savings, explained in depth in the following section.

Financial Analysis: We performed financial analyses on five of well-reputed HSEE hand dryers as shown in Table 1. Table 2 outlines the annual costs associated with a paper towel dispenser system.

In comparing the annual and 10-year costs of the HSEE hand dryers to a paper towel dispenser system, it is apparent that the campus should consider the removal of paper towels. For the analysis, if we assume the following: (1) paper towel rolls are \$10 each; (2) each paper towel dispenser uses one battery pack a year, which costs \$15 each; and, (3) the cost of installing a hand dryer is \$600, the payback period for switching to HSEE hand dryers is 1.25 – 2 years, regardless of the model. Further, over 10 years of operation, the HSEE hand dryers cost approximately eight times less to operate and maintain than the current paper towel dispenser system.

Based on the warranty, noise level, drying time, energy use, and 10-year cost, we believe that the two best options are the World Dryer SLIMdri and the Saniflow MO6A. Both models have the most inexpensive unit cost, have relatively low energy costs, are quieter than other models, and have 10-year warranties. We favor the Saniflow model because it is quicker, quieter, and manufactured in Europe, versus China. Although, as demonstrated by the analysis below, any HSEE model would provide the College with significant financial and environmental benefits.

Table 1: Hand Dryer Analysis for One Unit

Option #	Product Name	Price per Unit	Warranty (Years)	Drying Time	Decibel Level	Manufacturing Location	Price per Installation	Cost per Dry	Uses per Year (350 days, pop. 50, 3 uses/day)	Energy Cost Per Year	First Year Full Cost	10 Year Full Cost	Payback Period
1	Dyson Airblade V	\$800.00	5	12	85	USA	\$600.00	\$0.00046	52,500	\$24.25	\$1,424.25	\$1,642.55	1.95
2	Excel Dryer XLERATOR	\$400.00	5	12.5	80-85	Malaysia	\$600.00	\$0.00050	52,500	\$26.32	\$1,026.32	\$1,263.18	1.33
3	World Dryer SLIMdri	\$350.00	10	15	77-82	China	\$600.00	\$0.00042	52,500	\$21.98	\$971.98	\$1,169.81	1.25
4	Saniflow MO6A	\$350.00	10	12.5	64-74	Europe	\$600.00	\$0.00041	52,500	\$21.60	\$971.60	\$1,166.02	1.25
5	American Dryer EXT7	\$385.00	5	13.5	69-83	USA	\$600.00	\$0.00018	52,500	\$9.47	\$994.47	\$1,079.75	1.26

Table 2: Paper Towel Dispenser System Analysis for One Unit

Approx Cost per 800'/9600" Roll	Uses per Year (350 days, pop. 50, 3 uses/day)	Approx Number of rolls used per year (at 15" a use)	Battery Pack Cost (1 per year)	Cost of Disposal (per year)	Annual Full Cost	10 Year Full- Cost
\$10.00	52,500	82.03	\$15.00	\$61.01	\$896.32	\$8,963.23

¹ Montalbo, T., Gregory, J., & Kirchain, R. "Life Cycle Assessment of Hand Drying Systems."

² <http://continuingeducation.construction.com/article.php?L=199&C=637&P=1>