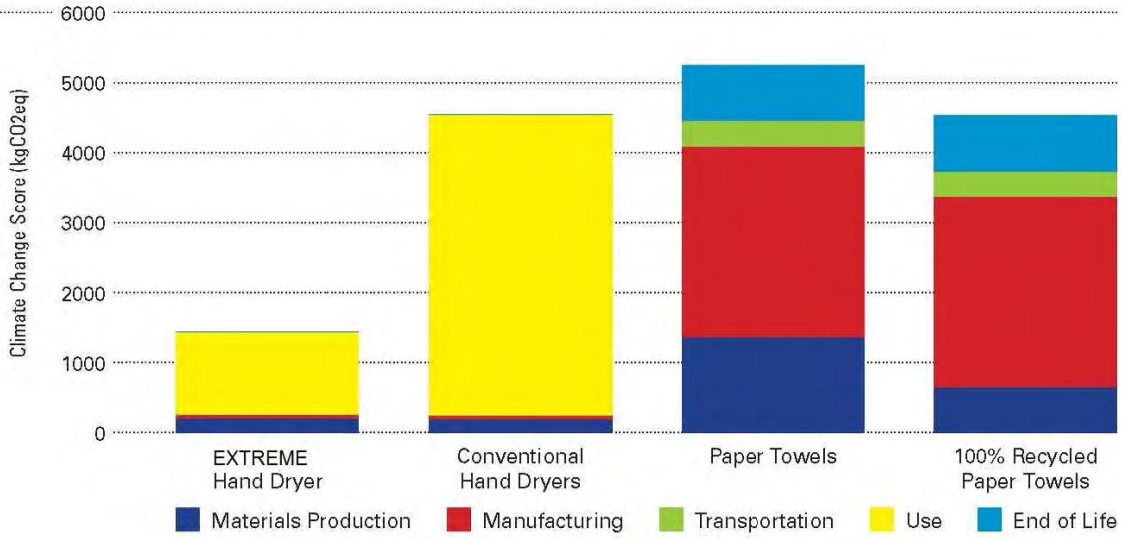
COMPARATIVE ENVIRONMENTAL LIFE CYCLE ASSESSMENT OF HAND DRYING SYSTEMS

CARBON FOOTPRINT

Reduces Carbon Footprint
Up To 70% vs.
Even 100% Recycled
Paper Towels



This study has been peer-reviewed by an independent panel of Life Cycle Assessment (LCA) experts to ensure compliance with the standards contained in ISO 14040..

While the EXTREME hand dryer is a clear leader in energy efficiency among electric hand dryers, it has not been certain to what degree this large efficiency advantage translates into significant environmental benefits over the full life cycle of such a dryer. It is also not clear how the EXTREME compares with other hand drying alternatives, such as virgin or recycled paper towels. To answer these questions, an environmental life cycle assessment (LCA) has been conducted comparing the various systems for drying hands in public restrooms.

The LCA method examines a broad range of environmental impacts at all stages of a product life cycle, including all material, energy, and pollutant inputs and outputs. The systems compared here include the EXTREME high-efficiency electric hand dryer, a conventional electric hand dryer, and paper towels containing between 0% and 100% recycled content. Each system was evaluated to determine the environmental impact of providing 10 years of service (drying 260,000 pairs of hands). The results show that the EXTREME hand dryer reduces the environmental impact of hand drying by 50% to 75%.

A wide variety of environmental impact categories were evaluated and the EXTREME proved to provide an environmental advantage in each category. In addition to reducing climate change impacts (carbon footprint), the EXTREME also reduces the use of non-renewable energy, impacts on ecosystems and emissions that damage human health.

In comparison to paper towels, the combined environmental impact of producing the paper towels and associated materials far exceed the impact from the use of the EXTREME . Although the use of recycled paper fibers in the towels may reduce the impacts of this system, even at 100% recycled content, the EXTREME maintains a significant margin of benefit.

A wide variety of sensitivity tests and scenario evaluations demonstrate that the margin of benefit for the EXTREME is quite substantial and not dependent on certain assumptions or conditions. A test of uncertainty in the results shows that the confidence in the benefit of the EXTREME in comparison to the other systems is quite high.

In comparison to paper towels, the combined environmental impact of producing the paper towels and associated materials far exceed the impact from the use of the EXTREME

Figure 2:
Impacts of each hand drying system under different user behaviors.

Among the sensitivity tests that have been conducted are variation in the amount of recycled content for the towels, the method for determining the impacts of recycled content, the assumed source of electricity, and the behavior of the user.

The scenarios regarding user behavior reveal the important role the user plays in determining the overall impacts of each system. "High intensity" users will cause a significantly larger impact and the increase is nearly in proportion to the amount of dry-time or length of towel used. Even "high intensity" users of the EXTREME system remain at a lower level of impact than "low intensity" users of other systems.

A scenario using wind power for production and use of the systems suggests that use of the electric dryers with renewable energy is the most environmentally friendly option, resulting in only 1/20th the climate change impact of paper towels. While paper towel systems may see improvements through energy savings or use of renewable energy in manufacture, the potential for increase is unlikely to be sufficient to allow them to surpass high-efficiency electric dryers.

Quantis
Sustainability counts

Use of the electric dryers with renewable energy is the most environmentally friendly option, resulting in only 1/20th the climate change impact of paper towels.

CATEGORIES	EXTREME	CONVENTIONAL DRYER	PAPER TOWELS
FUNCTIONAL UNIT	Drying 260,000 pairs of hands	Drying 260,000 pairs of hands	Drying 260,000 pairs of hands
PRODUCT NEEDED FOR FUNCTIONAL UNIT	One dryer and 1381 kWh electricity	One dryer and 5108 kWh electricity	One dispenser plus 37,960 m^2 of paper towel
HOUSING COMPONENTS	Zinc, stainless steel or reinforced resin	Zinc and aluminum	Polypropylene
INTERNAL COMPONENTS	Motor, fan, optical sensor, wiring	Motor, fan, optical sensor, wiring	Motor, optical sensor, batteries
MANUFACTURING LOCATION	East Longmeadow, Massachusetts, USA	USA	USA
DISTRIBUTION	Shipped as single units or on pallets to distributor	Shipped as single units or on pallets to distributor	Shipped as single units or on pallets to distributor
SUPPLY CHAIN DISTANCES	750 km by truck and 750 km by ship for all components	750 km by truck and 750 km by ship for all components	750 km by truck and 750 km by ship for all components
PACKAGING MATERIAL	Plastic liner bag within cardboard box, with molded pulp end caps	Plastic liner bag within cardboard box, with molded pulp end caps	Dispenser in plastic bag within cardboard box; towels in cardboard box
RECYCLING RATE	Packaging recycled at national material averages; dryer components not recycled	Packaging recycled at national material averages; dryer components not recycled	Packaging recycled at national material; dispensor components not recycled; towels not recycled
USE PHASE ASSUMPTIONS	12 sec. run time at 1500 W/electricity (+1.5 sec shutdown)	30 sec. run time at 2300 W/electricity (+1.5 sec shutcown)	2 towels used, with 0.073 m^2 area per towel