

# PROCTER AND GAMBLE



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## COMPANY PROFILE

Founded in 1837, Procter and Gamble has grown to become the world's largest producer of consumer goods. Procter and Gamble's product line is vast, including beauty, health, and household care lines. In 1956, Procter and Gamble opened a plant in Iowa City, which now employs more than 600 people. The plant manufactures products for brands Head and Shoulders®, Herbal Essences®, Old Spice® and Scope®, along with other health and beauty products.

## PROJECT BACKGROUND

At Procter & Gamble, water is cleaned for production using a reverse osmosis (RO) system. RO results in two streams of water: a clean permeate stream and a reject stream. With the help of an additional RO unit, the reject stream of water can be cleaned and used for production, lowering the amount of city water needed for manufacturing.

## INCENTIVES TO CHANGE

Procter & Gamble is committed to reducing their environmental footprint. In 2010, the company set a strategic goal to reduce energy, waste, CO<sub>2</sub> and water usage by 20 percent over a ten-year period.

The Iowa City plant's focus on hair care and oral rinse products, both primarily water-based, means that water is a major cost for the plant. Utilizing an existing water stream that would otherwise be disposed of can increase efficiency. In addition, costs decrease for both incoming city water and outgoing wastewater treatment.

## RESULTS

**Additional RO Unit:** An RO system works by filtering the solids out of water, concentrating the solids into a smaller "reject stream". Although the Iowa City plant's RO system is highly efficient, a large volume of reject water is still produced. By installing an additional RO unit to filter the reject stream, then sending that water to the start of the RO loop in a "double pass" system, less incoming city water is required. Furthermore, less wastewater is produced as water can be re-used.

More than 11 million gallons of water could be saved each year with an additional RO unit. The annual financial impact would be a savings of \$113,755 in water and sewage treatment bills. An additional benefit of a fourth RO unit is sustainability; the water sent through the entire RO system becomes cleaner. This lowers the rate of fouling on the RO membranes, thus reducing maintenance costs.



**Heat Recovery from RO Water:** In addition to savings in water and sewage treatment costs, a double pass RO system can also save money in water heating bills. To achieve maximum operating efficiency, water sent through the RO system should be 74°F. City water enters the plant at around 55°F and is sent through a heat exchanger attached to one of the plant's boilers. Water in the "reject stream" is much closer to the temperature required for RO. Mixing the recovered water with the city water feed will raise the incoming water temperature by more than one degree. As a result, \$7,897 could be saved in natural gas costs.

## CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

From Recommendations in Recommended Status

TOTAL FOR ALL SECTORS								
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	NO <sub>x</sub>	VOC	PM <sub>10</sub>	MTCO <sub>2</sub> e
30.76	0.06	202.87	106.24	0.30	0.05	0.17	0.04	340.43

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
ADDITIONAL RO UNIT	\$113,755	10,437,210 GALLONS	RECOMMENDED
HEAT RECOVERY FROM RO WATER	\$7,897	15,261 THERMS	RECOMMENDED

