

Managing Energy Costs in Dry Cleaners and Laundry Facilities



Due to rising energy prices, utility bills make up a considerable share of total operating expenses for commercial laundry and dry-cleaning facilities. In many of these facilities, large quantities of natural gas are used to run boilers to heat water or produce steam. A significant portion of the electric load can also be attributed to space heating and cooling, lighting, dry-cleaning machines, electric clothes dryers, electric motors for tumblers and agitators, and reciprocating equipment like air compressors. Water heating, space heating, and gas clothes dryers are the major end uses for natural gas in these types of facilities.

Average energy use data

Table 1: Utility usage, by cleaning technique

Using a 2004 study prepared for the Los Angeles Department of Water and Power and a 2009 study prepared for Southern California Edison, it's possible to compare the levels of electricity, natural gas, and water used in five different cleaning techniques. Although natural gas consumption remained relatively constant across all equipment, electricity and water consumption varied considerably.

Technique	Consumption per 100 lb of clothes		
	Electricity (kWh)	Natural gas (therms)	Water (gallons)
Carbon dioxide	30.9	13.4	16.0
Perchloroethylene	26.6	12.0	181.0
Petroleum	35.5	13.1	18.0
Professional wet cleaning	9.3	9.0	87.0
Silicone bead	54.2	13.4	51.0

Notes: kWh = kilowatt-hour; lb = pound. © E Source
 Data on electricity and gas consumption is from a 2009 report by Southern California Edison; data on water consumption is from a 2004 report by the Los Angeles Department of Water and Power.

Top technology uses

- Water Heating
- Cooling
- Lighting

To better manage a building's energy costs, it helps to understand how utilities charge businesses for energy. Most utilities charge commercial buildings for natural gas based on the amount of energy delivered. Electricity, on the other hand, can be charged based on two measures: demand and consumption. The consumption component of the bill is based on the amount of electricity, in kilowatt-hours (kWh), that the building uses each month. The demand component is measured in kilowatts—many electric utilities structure billing rates based on the average demand of a facility during a billing period, in 15-minute increments. Demand charges can range from a few dollars to more than \$20 per kilowatt per month.

Energy costs are among the few expenses that can be decreased without negatively affecting product quality or productivity. By implementing energy-efficient operations and maintenance (O&M) strategies and adding features to increase the efficiency of existing equipment, you can achieve substantial energy savings, not to mention numerous non-energy benefits like water savings and improved work conditions within the facility. Cutting energy costs offers a competitive edge, especially for midrange dry cleaners (those that are neither discount nor high-end and that do not compete on price or exclusivity). Adopting an energy-saving agenda also attracts eco-conscious consumers, who are often willing to pay more for products and services that they perceive as environmentally sound.

An on-site energy audit shows how much energy your facility consumes and reveals problems that, when corrected, could save you significant amounts of money. An audit is highly recommended as the first step toward implementing an efficiency program, and many utilities offer the service free or at a discount. Audits generally consist of a walk-through inspection of a facility's physical characteristics. Auditors commonly check the temperatures of air-

conditioning systems, refrigerators, and water heaters; inspect weather stripping and caulking around doors and windows; check thermostat calibration; and inspect air filters and duct systems. In some cases, diagnostic equipment is used to further investigate potential savings opportunities in a facility's building shell, boiler, and reciprocating equipment. Once the audit is complete, the auditor will make specific recommendations for improving the efficiency of your facility, prioritized by how cost-effective the improvements would be.

QUICK FIXES

this section

The quickest, easiest way to start saving energy in your facility is by starting with strategies that are simple to implement, that are free, or that cost very little.

Turning things off

The quickest and easiest way to reduce energy use is to ensure that equipment is turned off when it's not needed—savings of up to 25 percent are possible.

Lighting. Encouraging employees to turn lights off on their way out can save 8 to 20 percent of the energy spent on lighting—this could be as simple as putting up signs in break rooms and bathrooms. Alternatively, use **lighting controls** such as **occupancy sensors** and photosensor controls to adjust indoor lighting automatically. These measures ensure that lighting levels are appropriately maintained, and they don't require staff training. Timers installed on outdoor signage and window displays also reduce costs.

Turning things down and reducing HVAC loads

Some equipment cannot be turned off entirely, but turning it down to minimum levels when possible can save energy.

HVAC systems. Using a **programmable thermostat** properly to control temperature can save up to 10 percent in energy costs each year. Other low-cost strategies to cut heating and cooling costs include installing ceiling fans to help destratify and circulate inside air, taking weatherization steps such as sealing gaps around doors and windows to minimize air infiltration, and installing insulation on water and refrigerant lines to help reduce heating and cooling losses.

Boilers. Boilers can account for 20 to 60 percent of total energy costs in commercial

laundering facilities. Recommended efficiency improvements include installing controls such as vent (or flue) dampers that prevent chimney losses by closing off a boiler's vent when the boiler isn't firing, timers that allow boilers to be sequenced according to variations in the heating load, and variable-speed drives installed on boiler fans and circulation pumps to reduce part-load energy consumption.

Cleaning and maintenance

Proper equipment maintenance increases overall efficiency, extends the useful life of equipment, and prevents the need for costly replacement. If you're not sure where to start, [Chapter 9: O&M Ideas for Major Equipment Types](#) (PDF) of the Federal Energy Management Program's O&M Best Practices Guide offers maintenance checklists, including some for laundry and dry-cleaning equipment.

Boilers. Incorporate inspections of piping, joints, drain valves, and flexible hoses into regular maintenance routines. The amount of natural gas a facility consumes is highly dependent on the condition of boilers and steam-delivery systems, making boiler maintenance especially important. By repairing leaking steam traps and insulating pipe work to reduce heat loss, you can achieve boiler energy savings of between 10 and 30 percent.

Chillers. Chiller systems are used to transfer heat away from dry-cleaning machines and can consume a considerable amount of electricity. A poorly maintained system can have annual operating costs that are higher than necessary. Basic maintenance steps include sealing refrigerant leaks and establishing appropriate temperature setpoints.

Air compressors. If your facility uses a [compressed air system](#), make sure that the hoses and valves aren't leaking. A poorly maintained system can waste between 25 and 35 percent of its air due to leaks alone. In addition, regularly cleaning intake vents, air filters, and heat exchangers will increase both equipment life and productivity. An ultrasonic leak detector can be used to identify and fix leaks in compressed air distribution lines; this tool isolates sound frequencies, compares the frequencies to those of a properly functioning line, and provides a performance read-out to the user via hand-held digital display.

Steam traps. Steam traps are automatic valves that release condensed steam from the boiler while preventing the loss of live steam. A steam trap with a valve stuck half-open for six months can result in an annual fuel cost of more than \$4,000. As with compressed air systems, ultrasonic leak detectors can effectively detect faulty steam traps.

LONGER-TERM SOLUTIONS

this section

Replacing old, inefficient equipment maximizes the energy-saving potential—and therefore the cost-saving potential—of your facility. The best time to consider replacement is when existing equipment is over 10 years old.

Energy Star–qualified commercial washing machines

Consider replacing aging or failing equipment with units that are qualified by [Energy Star](#). Clothes washers that have earned the Energy Star are 37 percent more efficient than nonqualified models and are more efficient than models that simply meet the federal minimum standard for energy efficiency. Energy Star published a [case study on Colesville Towers](#) (PDF), a 270-residence apartment building in Silver Spring, Maryland, which replaced 14 standard-efficiency commercial washers with Energy Star units. The new washers reduced energy and water usage by 50 percent and accrued annual utility bill savings of about \$2,600.

Garment-cleaning technologies

Four alternative cleaning technologies use less energy than conventional laundry equipment (**Table 2**). All but the carbon dioxide (CO₂) system described below are commercially available.

Table 2: Alternative commercial laundry technology options

Alternative and advanced commercial laundering technology offers both energy and non-energy benefits, but the expected simple payback periods vary widely—anywhere from a few months to 10 years. It’s important to understand what the end-use application will be before investing in alternative laundry equipment.

Equipment type	Savings			Chemical (%)	Simple payback period (years)
	Electricity (%)	Gas (%)	Water (%)		
Ozone systems	25	91	35–70	NA	< 1
Polymer-bead systems	-50	100	75–80	NA	5 with incentives, 10 without
Liquid CO ₂ systems	33	22	100	70	2 to 4 ^a
Wet-cleaning systems	20	14	NA	80	2 to 3

Notes: CO₂ = carbon dioxide; NA = not applicable.

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a. Liquid CO₂ systems are not yet commercially available.

Ozone laundry. Ozone-based equipment cleans and disinfects in cold water, eliminating the need to use gas to heat water. Ozone kills bacteria 3,000 times faster than chlorine, and it’s an effective biocide in solution with water. Ozone also turns soluble soils into insoluble ones that can be separated from the water by the mechanical action of a washing machine, resulting in reduced use of chemical cleaning agents.

Ozone laundry systems can be retrofitted onto most existing washing machines with the installation of an ozone generator and minimal additional piping, or washing machines can be purchased with an ozone generator. Because ozone generators are electric, ozone laundry equipment may consume more electricity than conventional equipment, but they can more than make up the difference in money saved due to reduced use of detergent, water-heating fuel, and water. These systems may reduce drying time because the process opens up the cloth fibers; they also require smaller amounts of softeners, which tend to hold moisture.

Polymer beads. Polymer bead laundry equipment uses small plastic beads that are polarized with a catalyst to attract and then absorb dirt and stains from garments. Special laundry equipment is needed to contain, disperse, and mix the mass of beads thoroughly among the garments. Millions of beads are used—with a total weight approximately double that of the laundered material—and they may be reused for up to 700 loads. Polymer bead technology can reduce water use by 75 to 80 percent, requires no water heating, and uses about half as much detergent as standard commercial washing machines. In addition, cycle times are slightly shorter and garment drying requirements are reduced as a direct

result of reduced moisture content. Although electricity usage is higher for polymer bead systems than for standard commercial washing machines, the added electricity consumption is far outweighed by the significant water and natural gas savings for these systems.

Liquid CO₂. This emerging garment-cleaning technology uses pressurized, liquefied CO₂ as the cleaning solvent, requiring no water or water heating. Additionally, it doesn't require any energy or gas expenditure for drying because after the cleaning cycle is complete, the garments are brought back to atmospheric pressure, where the CO₂ vaporizes and is typically recaptured, leaving the garments dry and cool to the touch. The system uses a small natural gas-powered steam boiler to assist in CO₂ evaporation and recapture, so some gas is still consumed in the process.

CO₂ has excellent cleaning properties; it has also been documented as extending the life of garments and minimizing the risk of damage to fragile textiles. The process causes no color-bleeding and less fading and wear than with conventional equipment, which means garments last longer and retain their shape, feel, and luster. CO₂ cleaning is ideal for delicate, difficult-to-clean garments such as leather, silk, beads, sequins, wool, lace, fur, nylon, spandex, and coated fabrics typically used in the outdoor recreation industry. It has also been demonstrated to successfully clean non-standard garments like oily kevlar vests, protective clothing, and clean room garments. CO₂ laundry is an emerging technology in the very early stages of commercialization and we are only aware of one manufacturer, [Tersus Solutions](#) .

Commercial wet cleaning. Although the large majority of dry cleaners reportedly still use toxic cleaning solvents like perchloroethylene (PCE), there is a consumer trend to seek "greener" alternatives. In terms of energy efficiency, wet-cleaning systems use 20 percent less electricity and 14 percent less natural gas than PCE machines. Computer-controlled washers and dryers, horizontal cleaning drums, low-speed agitators, high-speed moisture extraction, moisture sensors, and the elimination of cooling systems are all features that enhance the efficiency of wet-cleaning systems and make it competitive with PCE-based cleaning. However, for especially sensitive materials, wet cleaning has the potential to damage garments and thus may not always be a viable alternative.

Additional energy-efficient equipment upgrades

Lighting. Lighting upgrades require the lowest investment for the returns they yield. Replace T12 [fluorescent lamps](#) and magnetic ballasts with high-performance T8 [fluorescent lamps](#)

and electronic **ballasts** ; consider installing tubular **LEDs** or new LED troffer fixtures. Replace incandescent lamps with **CFLs** or LEDs, and install occupancy sensors in frequently unoccupied areas such as restrooms, storage areas, or break rooms.

Boilers. Energy Star–rated boilers are up to 12 percent more energy efficient than standard models. Installing such options as condensing models could reduce heating costs by one-third. Made of noncorrosive stainless steel, condensing boilers have the added benefit of reduced maintenance costs.

Heat recovery. Heat recovery is increasing in popularity among dry cleaners. Heat-recovery systems capture exhaust heat and transfer the heat to incoming boiler feed water, reducing the amount of energy needed to heat water.

Hot water systems. If your water heater uses natural gas, consider switching to a high-efficiency version. Ultra-efficient and condensing **natural gas models** are available that are 18 to 36 percent more efficient than conventional gas water heaters.

If you have an **electric water heater** , consider replacing it with a **heat pump water heating system** . Especially in areas with a moderate-to-warm climate, a heat pump water heater can do the same job as a standard electric water heater while using half the electricity. What's more, the heat pump transfers heat from your building's interior into the water tank, thereby reducing the load on your air-conditioning system as well.

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