

A program sponsored by the City of New York Department of Sanitation, the New York State Energy Research and Development Authority, and the U.S. Environmental Protection Agency Region II

Stadiums, Arenas & Convention Centers

Premier Issue

This is the premier issue of *NYCWasteLe\$\$*, your information source on reducing costs through improved efficiency. You can rely on this waste reduction and energy conservation quarterly to keep you informed of important developments and cost saving opportunities for stadiums, arenas, and convention centers.

NYCWasteLe\$\$ is a non-regulatory waste prevention program initiated by the New York City Department of Sanitation (DOS) with support from the New York State Energy Research and Development Authority (NYSERDA) and the U.S. Environmental Protection Agency (EPA) Region II. *NYCWasteLe\$\$* supports City waste prevention efforts to help local businesses maintain and enhance their competitiveness.

The *NYCWasteLe\$\$* program has targeted nine business and institutional sectors, including restaurants; retail food establishments; manufacturers; wholesalers; retailers; schools; airlines/airports; stadiums, arenas and convention centers; and hospitals. The results of the program are showcased in these newsletters and on the *NYCWasteLe\$\$* web site coming soon. In addition, you are invited to a free waste prevention, and energy efficiency seminar on July 14, 1999. Call Jen Pezzullo at (800) 729-4210 to receive an invitation and to register for the stadiums, arenas, and convention centers seminar. ■

Compact Fluorescents: See Them in a New Light



In a convention facility that measures its space in hundreds of thousands of square feet, even small improvements in lighting efficiency can save thousands of dollars.

Replacing incandescent bulbs with compact fluorescent lamps can reduce energy costs, replacement lamp costs, and labor costs. As you improve your bottom line, your patrons and employees will enjoy the cool, soft white light emitted by compact fluorescent lamps. Compact fluorescent lamps (CFLs) are small, highly energy efficient light bulbs that can be used in place of standard incandescent

or halogen bulbs. CFLs typically fit in a standard incandescent socket, so there are no retrofit costs, and they produce more light per watt than conventional bulbs so they save you money on energy costs. CFLs do cost more than traditional incandescents but, because they last at least ten times longer, they pay for themselves in a very short time.

A typical facility in New York City replacing 50 75-watt incandescent bulbs with 50 20-watt compact fluorescent lamps would reduce energy use from 45 kilowatt hours per day to 13.2 kilowatt hours per day and, over the course of five years, would save approximately \$5,900 in energy and replacement lamp costs.

Source: Back-to-School software developed by the Center for Renewable and Environmentally Sustainable Technologies

New advances have done away with the flickering, humming, slow starts, and poor light traditionally associated with fluorescent lamps. The new generation CFLs are smaller, and they come in a variety of shapes and styles suitable for public areas.

A 20-watt CFL produces the light of a 75-watt incandescent. Typical costs range from about \$12 to

New Development Cuts Cost of Lighting Exit Signs

Exit signs — they are everywhere and they are a necessary part of every business. Depending on the size of your facility, you may have a handful or you may have hundreds.

No matter the number, exit signs must be illuminated 24 hours a day, 365 days a year, providing necessary direction during emergencies, and always using electricity.

LEDs, or light-emitting diodes, are the lights that illuminate your digital clock radio and stereo. They are the wave of the future, lighting up

everything from exit signs to traffic lights, while using only a small amount of electricity for the amount of light they emit.



Exitronix Models 600 and 700 are available in both 6" and 8" letters.

Overall, LED exit signs are more cost effective, more energy efficient, and often more visually appealing than incandescent or compact fluorescent alternatives, and they last longer. The following table presents a comparison of incandescent, fluorescent, and LED systems.

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- Food Marketing Institute • Grand Central Partnership • Greater Jamaica Development Corporation • Greater New York Hospital Association • Hotel Association of New York City
- Jacobi Medical Center • The Jacob K. Javits Convention Center of New York • Hunts Point Terminal Produce Market • Long Island City Business Development Corporation • Met Food
- New York City Board of Education • New York City Department of Business Services
- New York City Department of Parks and Recreation • New York City Trade Waste Commission
- New York Convention & Visitors Bureau • New York Hospital • New York State Restaurant Association • Pizzeria UNO • The Port Authority of New York & New Jersey at LaGuardia
- Public School 48, Bronx • Shea Stadium • Sheraton New York Hotel and Towers • ShopRite
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- US Airways at LaGuardia • Volume Services America, Inc. • Wakefern Corporation

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Spotlight On: Energy Efficiency

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Recycling

Ice Arena Technology

The numerous ice arenas in the New York City area, varying in size and use from small, community or school arenas to Madison Square Garden and Rockefeller Center, all require intense upkeep and monitoring to maintain proper ice conditions and ensure efficient resource use. New York City arena operators are always looking for more energy efficient and less costly systems. They may benefit from recent technologies for water and energy use reduction.

A typical hockey ice arena uses almost 75,000 gallons of water per season. The initial surface uses 10,000 gallons of water per inch of ice, and each resurfacing uses an additional 75 gallons.

— Providence Civic Center

Improving water quality using one of several demineralization methods, such as reverse osmosis or deionization, can increase energy efficiency. Through reverse osmosis, 95 percent of minerals, salts, and other impurities are removed. The resulting, relatively pure water allows the ice pad to operate about 4°F warmer. Every 1°F rise of the ice pad temperature yields an estimated six percent savings in cooling costs, according to *On Ice*, an ice arena industry newsletter.

“By using the reverse osmosis water system, we have definitely seen savings in costs and it provides a nicer surface for skating.”

— Joe Church, Assistant Director of Physical Plant, University of Vermont

Purifying water also eliminates pH swings, reducing corrosion of pipes and equipment. Purified ice is more resistant to chipping and gouging, says Joe Church at the University of Vermont, so ice thickness can be reduced to 3/4 to 1 inch from the typical 1-1/8 to 1-1/4 inches. The amount of water needed to create the surface during the initial flooding and throughout the season is decreased substantially. A standard-sized arena (85' x 200') may reduce water used in the creation of the ice surface by 5,000 to 10,000 gallons.

Energy costs decrease because the temperature of the water in the ice resurfacer can be reduced by 50°F. Overall, the reverse osmosis water system saves an anticipated 14.5 percent on the electric bill, or approximately \$13,900 a year for a standard ice arena, according to the ASHRAE Refrigerator Handbook.

Energy Efficient Ice Arena Technology at the University of Vermont

At the University of Vermont's ice arena, 3,600 gallons of water flush through the compressor each day. Adding a recirculation loop saved \$8,500 per year with a payback time of three to four years. The heat from the ice plant compressors is used to heat the water used in the ice resurfacer, reducing the use of natural gas.

For more information, visit their Web site at www.uvm.edu/~energy/gutt_ice.html.

At that rate, the system pays for itself in just over two years.

The refrigeration system also is an energy efficiency target. According to on-campus research at Rensselaer Polytechnic Institute, many arena operators prefer anhydrous ammonia systems because they

Isanti Arena's Innovations

Minnesota's Isanti Arena, capacity 1,000, is the first arena in the U.S. to use a ground source heat pump. The system pulls heat away from the ice and redirects it to heating coils under the floors and seats in the stands. This system is 50% more economical than a conventional compressor because it cuts down on both heating and cooling costs, says Tim Doherty, a business resource consultant with Connexus Energy, who worked on the project. According to Mr. Doherty, all the heat removed from the ice and generated by the refrigeration system is recovered and used for heating the stands and resurfacing the ice, creating a system that is 300 to 400 percent more efficient than standard systems.

Isanti Arena also will use electric-powered ice resurfacers to improve indoor air quality. This decreases the amount of fresh air that must be brought in to replace the air exhausted during ice resurfacing. Less moist, fresh air creates less condensation and decreases the workload on the cooling system.

operate at lower pressures and the smaller compressors require less coolant water.

According to Hy-Save Inc., a manufacturer of liquid pressure amplifiers, most air conditioning and refrigeration systems waste 20 to 40 percent of the electrical power they use. A liquid pressure amplifier maintains higher refrigerant pressure, reducing flashing and energy loss. An amplifier can be added to an existing setup to improve energy efficiency. Pumping liquid refrigerant is 40 times more effective than using head pressure to do the same job.

In the long run, use of a liquid pressure amplifier can reduce the repair costs of compressors by up to 75 percent. The liquid pressure amplifier design reduces operating costs by 50 percent, compared to arenas without this technology. ■

For more information on ice arena energy efficiency and management, contact Jack Vivian, an ice arena management expert. He is a past editor of *On Ice* newsletter, a publication for ice arena owners and managers, and director of the Sports Facilities Research Laboratory. Past issues of *On Ice* also may be available, although it is no longer published.

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3810 Varsity Drive
Ann Arbor, MI 48108
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NYC WasteLe\$\$ In Action

The Javits Center Retrofits and Cuts Energy Bills in Half

The Jacob K. Javits Convention Center, a NYC WasteLe\$\$ partner, located on the west side of Manhattan, hosts major conventions and trade shows, attracting 2.5 million visitors. To create a more efficient and a more comfortable facility, the Javits Center management embarked on a two-month lighting upgrade project. In the process, the Javits Center cut its annual energy costs by \$100,000, which is about half of its annual energy bill, according to Javits Center management.

The success of the project is based on a new technology — an adjustable dual reflector system for high intensity discharge (HID) luminaires designed for high bay lighting applications, such as the three cavernous exhibit halls at the Javits Center.

“...it made good business sense in two ways. It would save energy dollars and, at the same time, help attract convention business by putting better light on the show floor,” said Tony Bracco, Assistant Director of Operations at the Javits Center.

The unique dual reflector creates even, consistent light. Only about half as many fixtures were needed to replace the old metal halide luminaires, reducing wattage by half, while increasing light levels significantly. In addition, the new luminaires produce less heat, cutting air conditioning costs. The whole project has a payback period of less than two years.

Savings Scorecard

Massachusetts Ice Arenas Benefit From Energy Efficiency Improvements

The Massachusetts Department of Environmental Management owns and operates ice skating facilities throughout Massachusetts. Chuck Coin, of Northeast Energy Services Company (NORESKO), worked directly with the ice arenas to install numerous technologies. He says that the improvements have reduced DEM's utility costs by 33% for a benefit of \$450,000 annually, while improving arena lighting, ice quality, and exterior security lighting.

Featured improvements include:

- metal halide arena lighting,
- metal halide lighting dimming system,
- fluorescent T-8 lamps with electronic ballasts,
- low-emissivity ceiling insulation,
- high-efficiency packaged dehumidifiers,
- high-pressure sodium exterior lighting,
- two-speed brine pump motor controllers, and
- direct-digital control refrigeration controls.

Source: NORESKO, Frammingham, MA

Compact Fluorescents continued from page 1

\$25, yet the CFL will last from 7,500 to 10,000 hours, compared to about 750 hours for an incandescent bulb, according to GE Lighting and TechnaBright.

Historically, CFLs have not been well suited for some commercial settings because of their size, the quality of the light, and the fact that they could not be dimmed. Today's new product lines are more aesthetically comparable to incandescents and offer dimmable models.

Most of the major manufacturers of CFLs have introduced one-piece CFLs that combine the ballast and lamp. These one-piece designs are simpler to replace, and radial, spiral, and multi-tube designs help to reduce space requirements. The radial design provides more uniform light distribution, as well. In addition, all of the new designs now use electronic ballasts, which eliminate the flicker and buzz traditionally associated with fluorescent lamps.

Dimmable CFLs can be put in any standard incandescent socket; can be used with standard wall dimmers, photosensors, electronic timers, and occupancy sensors; and are ideal for use in recessed downlights.

The major manufacturers also have recently introduced compact fluorescent lamps in a traditional globe shape very similar in appearance to standard incandescent bulbs. These lamps can produce light equivalent to a 60-watt bulb while consuming only 13 watts — a savings of 80 percent over the life of the unit. These globe shaped lamps are ideal for use in desk, wall, floor, and table lamps; recessed cans; coach lights; utility lamps;

TYPICAL REPLACEMENT WATTAGE FOR CFS

Incandescent		Compact Fluorescent
60 Watts	→	11-15 Watts
75 Watts	→	15-20 Watts
100 Watts	→	18-28 Watts
150 Watts	→	29 Watts

Source: GE Lighting and TechnaBright. Note: Range may vary by manufacturer.



Compact fluorescent lamps come in a variety of sizes and styles to fit most existing fixtures.

and torchieres. There are even small 3-watt compact fluorescent lamps suitable for use in decorative lighting applications such as chandeliers and candelabras.

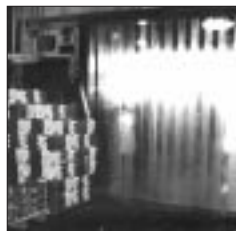
In addition, most of the CFLs now on the market provide light similar to soft white incandescent lamps and are much cooler than incandescents. In many settings, the cooler compact fluorescents also can help to reduce air conditioning costs. For more information about compact fluorescents, contact your lighting supplier or contractor. ■

Cut Your Losses With Vinyl Strips

The cold rush as you open the door of the walk-in cooler is welcome on a hot day until you find out that regularly opening and closing a walk-in cooler door over the course of one year can cost up to \$1,688 in refrigerated air loss, according to experts at Economax Manufacturing, a manufacturer of a wide range of strip doors. Installing vinyl strips is one way to combat energy losses. Vinyl strips are transparent plastic strips that fit snugly together and hang in a doorway to form a barrier against cold, heat, dust, insects, and noise.

According to Verilon® Products Company, installation of vinyl strips can decrease the running time of a refrigerator's compressor by reducing the refrigeration load up to 44 percent. Economax experts also indicate that vinyl strips can reduce energy losses by up to 75 percent, making them extremely effective in improving the energy efficiency of your refrigerator or freezer.

NYC WasteLess partners Blue Ridge Farms, Inc., The Jacob K. Javits Convention Center and many of the produce wholesalers at the Hunts Point Terminal Produce Market have installed vinyl strips on doors leading to loading docks and refrigerated units. ■



Vinyl strips offer an inexpensive way to reduce energy costs.

Features of Vinyl Strips:

- Reduce costs to maintain temperature.
- Operational between -20° and 170°F.
- Special low temperature strips are available for temperatures down to -60°F.
- Additional welding strips may be added to block 99% of UV radiation and reduce noise.
- Optional motion detectors and pull cords can raise doors automatically.
- Flame resistant, transparent, and noise deadening.
- Reduce filter maintenance by reducing dust.
- Easy to maintain and replace.
- Relatively inexpensive when compared to other door systems.

Source: Verilon® Products Company and Economax Manufacturing



FOR MORE INFORMATION:

Vinyl strips distributors include:

- Economax Manufacturing
621 Southeast 202
Portland, OR 97233
(800) 777-1507
www.economax.com
- Frommelt Safety Products
P.O. Box 12000
Dubuque, IA 52004-1200
(800) 553-5560
<http://frommeltssafety.com>
- Just-Rite Equipment Inc.
528 West 1st Avenue
Roselle, NJ 07203
(908) 245-1166
- Material Handling Sales, Inc.
9 Lund Road
Saco, ME 04072
(800) 458-6870
www.mathand.com
- Verilon Products Company
452 Diens Drive
Wheeling, IL 60090
(800) 323-1056
www.epark.com/html/verilon.html

Parking Lot Lighting

Effective parking lot lighting is sturdy, easily maintained, protected from possible vandalism and energy efficient.

The sun powers the newest outdoor lighting technology. A light-mounted solar panel collects energy during the day and stores it in a battery, which then powers the light from dusk until daylight. The battery, which is 100 percent recyclable, and the bulb need to be replaced about every five years. Even without direct sunlight for five consecutive days, the solar powered light still works. Solar lights offer other energy saving options including timers, motion sensors, and high and low settings. For each outdoor light, solar panels reduce energy use by approximately 800 kilowatts per year and eliminate more than 1,000 pounds of pollution, according to Solar Outdoor Lighting, Inc. The company used average operating cost assumptions and data from field tests conducted by universities, Underwriters Laboratory, and U.S. National Laboratories to calculate a one to three year payback period for most solar lighting systems. With this payback period, solar lighting adds a bright spot to anyone's day or night.

Did You Know?

- Over-lighting wastes more than \$1 billion every year in unnecessary energy use.
- Parking lot security is enhanced when illumination from lower wattage sources is directed from at least two, and preferably four, different lighting locations.
- Brighter lights create darker shadows and more hiding places.
- Using motion detectors that illuminate or intensify lighting in response to movement in a specific area can provide effective and energy efficient parking lot lighting.
- Programming your system to generate various lighting levels for different times of the day also will conserve energy and reinforce safety.
- Painting the ceiling and walls of a multi-level parking garage white or light blue will increase reflection and brighten the space.

Source: International Dark Sky Association, Gary R. Cooke P.E.



FOR MORE INFORMATION:

Solar lighting vendors and other energy efficient parking lot lighting contacts

- Brown & Ross International
234 Park St.
Hackensack, NJ 07601
(201) 488-0711
Fax: (201) 488-0415
- Kennedy Electric Supply
221-18 Merrick Blvd.
Jamaica, NY 11413
(718) 527-5600
Fax: (718) 527-6004
- Conserve Electric Supply
39-05 Crescent St.
Long Island City, NY 11101
(718) 937-6671
Fax: (718) 937-4057
- Solar Outdoor Lighting Inc.
3131 Southeast Waaler St.
Stuart, FL 34997
(800) 959-1329
www.solarlighting.com
- Graybar Electric
21-15 Queens Plaza N.
Long Island City, NY 11101
(718) 392-2000
Fax: (718) 482-8274
www.graybar.com
- Sunset Electric
84-60 Parsons Blvd.
Jamaica, NY 11432
(718) 658-4800
Fax: (718) 657-0433
- Kelly & Hayes
1042 Atlantic Ave.
Brooklyn, NY 11238
(718) 638-7702
Fax: (718) 789-1542
- Waldike
136 Clifton St.
Brooklyn, NY 11238
(718) 789-8800
Fax: (718) 998-7538

Cut Costs of Exit Signs → continued from page 1

EXIT SIGN LIGHTING

Type of Lighting	Electricity Cost to Operate One Sign for One Year	Average Unit Lifespan	Annual Maintenance Cost
Incandescent ¹	\$35.04	6 mos. - 1 yr.	\$24.33
Compact Fluorescent ²	\$10.51	3 - 5 years	\$8.33
LED ³	\$2.45	10+ years	\$1.04

¹Two 20 W bulbs. ²One 9 W bulb with 3 W adapter. ³One 2.8 W lamp.
 Note: This comparison assumes an energy cost of 10 cents per kWh. Maintenance costs are based on 25 minutes to replace bulbs at \$25/hour. This analysis does not take into consideration the cost of initial installation or replacement bulbs or lamps. Based on information by Astralite, Inc.

When converting to LED signs, you can either replace your exit signs with new LED signs or you can retrofit your existing signs with LED retrofit kits. A typical retrofit kit costs \$25 to \$35, while the cost of a new LED sign ranges from \$30 to \$115 for a single-face sign, or \$50 to \$130 for a standard double-side commercial grade product.

Syracuse University and Penn State both retrofitted and replaced existing exit signs throughout their facilities, saving \$175,325 and \$70,000 respectively. Savings were realized through reduced electricity, purchasing and labor costs, and the payback period was less than one year for both schools.

Source: Astralite, Inc.

The estimated 100 million exit signs in the U.S. consume up to 35 billion kWh of energy annually (the power generated by five large nuclear power plants). Illuminating these signs costs businesses and organizations about \$1 billion annually.

Source: U.S. EPA Energy Star® Exit Sign Program

In the future, and especially in New York City, the retrofit kit may not be a practical option. Underwriters Laboratory may require that the entire sign be UL listed, virtually eliminating retrofit kits. In addition, New York City's exit sign requirements state that signs must have 8-inch letters, while elsewhere in the U.S. laws and codes specify only 6-inch letters. Virtually no retrofit kits are made with 8-inch letters.

Experts warn that although LEDs offer tremendous savings opportunities, there are some factors to consider when purchasing LED exit signs or retrofit kits. For example, some LEDs, particularly commodity-grade LEDs, as opposed to premium LEDs, have been known to fade over time.

"Make sure that the LED you purchase is a high-quality bulb and check to make sure that it carries a minimum warranty of five years, with a guarantee that light levels will meet code requirements for the full five years," says Jennifer Dolin, director of U.S. EPA's ENERGY STAR® Exit Sign program. Also, surge protection should be an integral part of the sign, according to energy consultant Doug Sheppard of Advanced Energy and Lighting, Inc.

Unisys Corporation, the information management company, retrofitted or completely replaced 400 exit signs with LED exit signs and saved nearly \$21,000 in energy, purchasing, and labor costs during 1996. Approximately \$10,000 of savings was from reduced electricity costs, while \$6,000 was from reduced labor costs. The remaining savings were realized by reducing a large inventory of incandescent lamps. The payback period was just over nine months.

Source: Astralite, Inc.

Several companies offer LED exit sign products, including new signs, custom signs, and retrofit kits. LED exit signs are available in matrix, edge-lit, and stencil designs. U.S. EPA has established an ENERGY STAR® Exit Sign program. Exit sign manufacturers who meet the ENERGY STAR® guidelines for new exit signs (the program does not include retrofit kits) can use the ENERGY STAR® label to identify products that are energy efficient and meet visibility and luminance criteria.

Currently, 33 manufacturers have signed up for the program. Access the ENERGY STAR® Exit Sign program at www.epa.gov/exitsigns.html or call 1-888-STAR-YES to receive information about ENERGY STAR® partners. All of the exit signs listed on the Web site meet the ENERGY STAR® guidelines, and some of the manufacturers also produce retrofit kits.

The ENERGY STAR® Web site also offers a useful savings calculation sheet and tips for buying ENERGY STAR® compliant exit signs. Check your local phone book or contact manufacturers to identify LED exit sign vendors in the New York City area. ■

Energy Efficiency Technical Assistance Programs

Technical assistance programs for improving your energy efficiency are available from a variety of sources. Most programs are easy to access and offer free information. You may not have time to develop an energy audit plan for your business or perform hours of research to identify the brightest energy efficient lighting and equipment. However, if you want to make simple changes that will save you money and improve the efficiency of your business, consider relying on one or more of the following available resources.

Publications:

- ENERGY STAR® Buildings Upgrade Manual, U.S. EPA, publication number #EPA 430-B-97-024B, July 1997. Call (800) 490-9198 to request a copy.
- Lighting Research Center, Publications, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY, 12180. For more information: (518) 276-8716.

Hands-On Assistance:

- New York State Energy Research and Development Authority, FlexTech Program. Contact Mark Watson at (518) 862-1090 x3314.
- Energy Cost Savings Program, NYC Department of Business Services, (212) 513-6345/6415.
- Community Environmental Center 43-10 11th Street, Long Island City, NY 11101. Contact Lynn Grace, Director of Administrative Services, at (718) 784-1444.
- Advanced Energy & Lighting, Inc. 23 East 10th Street, Suite 615, New York, NY 10003. Contact Doug Sheppard at (212) 475-5774.

Internet Resources:

- Green Lights Program: www.epa.gov/greenlights
- ENERGY STAR® Program: www.epa.gov/energystar
- ENERGY STAR® Buildings: www.epa.gov/buildings
- ENERGY STAR® Buildings Upgrade Manual: www.epa.gov/appdstar/buildings/manual
- Energy User News: www.energyusernews.com
- National Lighting Bureau: www.nlb.org
- Business Energy Checkup: www.solstice.crest.org
- UCLA School of Arts & Architecture: www.aud.ucla.edu/energy-design-tools
- Today's Facility Manager: www.tfmgr.com
- NYSERDA Systems Benefit Charge programs: www.nyserda.org/sbc.html

NYC WasteLe\$\$ Program
 P.O. Box 156
 Bowling Green Station
 New York, NY 10274-0156

Bulk Rate
 U.S. Postage
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 Brooklyn, NY
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