

## Premier Issue

This is the premier issue of *NYC WasteLe\$\$*, 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 the manufacturing industry.

*NYC WasteLe\$\$* 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. *NYC WasteLe\$\$* supports City waste prevention efforts to help local businesses maintain and enhance their competitiveness.

The *NYC WasteLe\$\$* 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 upcoming sector-specific seminars. In addition, the *NYC WasteLe\$\$* web page will be on-line soon. ■

# Money Saving Motors:

## Tips for Improving Motor Efficiency



Photo by Department of Energy

Measuring the speed of a motor can determine its efficiency and load. DOE's Motor Challenge Program can help.

Would you like to increase the productivity and reliability of your motor systems and reduce energy costs? Improving maintenance practices on your existing equipment or purchasing new, higher efficiency motors can make it happen. According to the U.S. Department of Energy, commercial and industrial electric customers in the northeast region of the United States use 97 billion kWh annually to drive electric motors. Many of these motors do not operate at optimal efficiency resulting in higher operating costs.

- **Copper losses** due to low-quality copper wiring and windings can increase resistance.
- **Iron losses** resulting from low-grade iron lamination may interact with magnetic fields within the motor, increasing resistance.
- **Mechanical losses** associated with increased friction among the bearings or belts within the motor may require greater input.
- **Corrosion and dust** can contaminate lubricants, causing increased friction that can lead to premature bearing failure.
- **Incompatible greases** can coagulate and harden, damaging the motor.
- **Excessive grease** may enter the seal and damage the windings.
- **Misalignment of the motor and driver machine's shafts** causes vibrations, reduces work output, and increases energy use.

### Motor Efficiency Improvement Tips:

- Perform regular scheduled maintenance including lubrication, inspection and proper adjustment of drive belts.
- Perform scheduled, preventive maintenance, including air pressure vacuuming and cleaning with rags or brushes, to reduce buildup.
- Install filters in larger, enclosed motors to minimize corrosion and dust.
- During maintenance, run the motor without the plug to remove old lubricant prior to adding new lubricant.

## 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.



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.

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

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### In Partnership With:

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## Spotlight On: Energy Efficiency

## Next Issue Spotlight On: Recycling

## Don't Let Your Profits Go Out The Window

Less than a decade ago, the energy necessary to offset the heat lost and gained through windows cost the U.S. an astonishing \$20 billion dollars per year, according to the U.S. Department of Energy. That is 25 percent of all the energy used to heat or cool homes and businesses in this country. Windows are currently responsible for 15 to 35 percent of all the heat lost or gained in a new building; the percentage can be even greater in older structures, according to the National Center for Appropriate Technology. Another 10 percent of heated or cooled air can be lost through window frames.

What technologies can reduce this energy cost? Today a wide range of practical and cost-effective solutions are available to make windows more energy efficient, including tints, films, gas fills and improved window frames. These and many other "window technologies" can be used in combinations to yield increased energy efficiency and lower heating and cooling bills.

With all these options offering significant energy saving benefits, why let your profits go out the window?



Anderson Windows installed energy efficient low-e, high performance windows at this B.F. Goodrich manufacturing facility. The fixed casement and awning units also open to let in fresh air.

### Window Technologies at NRDC Headquarters

The Natural Resources Defense Council renovated a loft space in New York City's Flatiron district as its new headquarters. Walls and ceilings were insulated three to five times the industry norm, and the double paned windows were equipped with a reflective, transparent low-e film, called a "heat mirror," which reflects heat generated by sunlight in the summer, yet retains it in the winter. All of these improvements save the NRDC \$45,900 annually, or 54% of their total energy costs.

Source: Architectural Record



FOR MORE INFORMATION:

#### Assistance:

- Efficient Windows Collaborative  
U.S. Department of Energy  
Windows and Glazing Program  
[www.efficientwindows.org](http://www.efficientwindows.org)
- Energy Efficiency and Renewable Energy Clearinghouse  
P.O. Box 3048  
Merrifield, VA 22116  
(800) 363-3732
- Energy Efficiency and Renewable Energy Network  
[www.eren.doe.gov](http://www.eren.doe.gov)
- EnerAction Inc.  
4559 4th Street  
La Mesa, CA 91941-5501  
(619) 698-8101  
[www.eneraction.com](http://www.eneraction.com)
- National Fenestration Rating Council  
1300 Spring Street, Suite 500  
Silver Spring, MD 20910  
(301) 589-6372  
[www.nfrc.org](http://www.nfrc.org)

#### Vendors servicing New York City:

- Brooklyn Window and Door Corporation  
1889 McDonald Avenue  
Brooklyn, NY 11223  
(718) 627-6400
- E-Z Tilt Window Ltd.  
701 Avenue U  
Brooklyn, NY 11223  
(718) 627-0001
- Capris & Capri Window Corporation  
316 Onderdonk Avenue  
Ridgewood, NY 11385  
(718) 386-1652
- Reeb Millwork  
600 Brighton Street  
Bethlehem, PA 18015  
(610) 867-6160

#### Manufacturers:

- AFG Industry Inc.  
1400 Lincoln St., P.O. Box 929  
Kingsport, TN 37662  
[www.afg.com](http://www.afg.com)
- Andersen Corporation  
100 N. 4th Avenue  
Bayport, MN 55003  
[www.andersenwindows.com](http://www.andersenwindows.com)
- Insulate LLC  
5001 D Street  
Auburn, WA 98001  
[www.insulate.com](http://www.insulate.com)
- Marvin Windows and Doors  
P.O. Box 100  
Warroad, MN 56763  
[www.marvin.com](http://www.marvin.com)
- Pella Corporation  
102 Main Street  
Pella, IA 50219  
[www.pella.com](http://www.pella.com)
- Viking Industries, Inc.  
P.O. Box 20518  
Portland, OR 97294-0518

### WINDOW TECHNOLOGIES

Technology	What Is It?	Benefits	Drawbacks
<b>Low-emissivity (low-e) replacement windows</b>	Windows have a thin layer of silver sandwiched between layers of anti-reflective metal oxide that allows the sunlight to pass through while blocking the heat radiation. The glass is optically invisible. Multi-functional in that it also can be applied to the inner pane of glass in colder climates to reflect heat back indoors.	Can reflect 40% to 70% of the heat normally transmitted through a clear glass window. Offers higher performance than other coatings, with a reduction in damaging UV rays of 60% to 90%. Provides a higher level of light compared to the amount of heat reduction, making it more suitable for climates that require more air conditioning than heating.	Can add 10% to 15% to the price of a double glazed window.
<b>Reflective glass</b>	Reflective material is bonded with glass panes in new windows to reduce light entry. Most commonly used in new construction and window replacement.	The reflective film can block from 16% to 80% of all the solar energy entering the room, depending on the type of coating and the climate. Helps control heat gain in the summer. Reflective nature creates visual barrier from the outside.	Reduces the amount of light entering the room.
<b>Reflective film</b>	Reflective film is placed on new or existing windows to reduce light entry. Most commonly used on existing windows.	The reflective film can block 16% to 80% of solar energy entering the room, depending on type of coating and climate. Helps control heat gain in the summer. Reflective nature creates visual barrier from the outside.	Reduces the amount of light entering the room.
<b>Tinted glass</b>	Tints, such as bronze tint, are applied to glass to reduce solar heat gain. Provides better energy performance on larger windows, making them more suitable for commercial use.	Can survive the elements while reflecting glare and heat and saving up to 40% on air conditioning costs. Tinted glass can eliminate as much as 90% of the incoming solar radiation and light making it ideal for warm regions.	Does not allow as much heat in from sunlight if temperature is cooler. Reduces visible light entering the room.
<b>Tinted coatings</b>	Various shades of coatings applied to glass in new or existing windows to reduce solar heat gain.	The spectrally selective combination coatings can allow various amounts of heat and light in or out and are perfect for climates with both hot and cold seasons.	More susceptible to the elements than other coatings.
<b>Gas-filled windows</b>	Two or more panes of glass with argon or krypton gas sandwiched between them to reduce heat transfer through the glass.	Reduces convection heat loss and can increase the efficiency of a low-e coated window by an additional 15% to 20%. Gas-filled windows reduce heat loss and are, therefore, best for colder climates. Krypton is more effective, although more expensive, than argon.	More expensive than traditional windows. A mixture of argon and krypton is used as a compromise between thermal performance and cost.

Sources: U.S. Department of Energy's Energy Efficiency and Renewable Energy Network, and Efficient Windows Collaborative; Environmental Building News.

## Money Saving Motors: Tips for Improving Motor Efficiency ➔ continued from page 1

- Follow manufacturers' recommendations for grease to prevent overfilling.
- Keep the grease gun nozzle covered when not in use.
- Check motor alignment following installation and make periodic alignment checks part of preventive maintenance plans.
- Check motors for misaligned shafts or improperly adjusted belts that can lead to motor loss.

### What is a Premium Efficiency Motor?

Replacement may be the best way to improve motor efficiency. As amended by the Energy Policy Act of 1992 (EPAct), the Federal Energy Policy and Conservation Act of 1975 (EPCA) established energy efficiency standards and test procedures for commercial and industrial electric motors and requires manufacturers to certify that motors between 20 and 200 hp meet energy efficiency standards. New, premium efficiency motors contain thinner, high quality steel laminations in the rotor and additional copper in the windings. Premium efficiency motors also have improved power factors over standard motors.

Higher initial costs are offset by increased operating efficiency and decreased energy use. An energy efficient motor will save energy and money over its entire life. Maximum savings are achieved on high runtime applications.

### POTENTIAL SAVINGS FOR A TYPICAL MOTOR APPLICATION

50 hp, 1800 rpm, 460 V	Standard	Premium Efficiency
Full Load Efficiency	93.0	94.1
Efficiency (at 75% load)	92.0	95.5
Demand Reduction (at 75% load)	—	.80kW
Incremental Motor Cost	—	\$159
Energy Savings at 75% load (6000 hrs./yr.)	—	4807 kWh/yr.
Cost Savings at \$.07/kWh	—	\$336.49/yr.

Source: U.S. Department of Energy, U.S. Environmental Protection Agency, Electric Power Research Institute

### Programs To Help Improve Motor Efficiency

The U.S. Department of Energy established the Motor Challenge, a network of resources promoting energy efficiency in industrial motor systems. The Motor Challenge provides MotorMaster + 2.0 Software, containing data on more than 17,500 three-phase electric induction motors. Users analyze utility savings, store and retrieve testing and maintenance history, inventory motors, compare repair and replacement options and generate greenhouse gas emissions reports. Locally, the New York State Energy Research and Development

**Staten Island University Hospital** replaced more than 50 motors, operating fans and pumps and ranging in size from five to 60 HP, with high efficiency motors. Based on a 71.1% duty cycle, or 529 hours of operation in a 744-hour month, the motor upgrade produced demand savings of 52.315 kW and energy savings of 27,678kWh. These savings resulted in a reduction in operating costs of \$3,179 per month.

Source: Staten Island University Hospital

Authority (NYSERDA) is a Motor Challenge Allied partner. For more information on the Motor Challenge contact Jessica Zweig of NYSERDA at (518) 862-1090 ext. 3346 or [jlz@nyserd.org](mailto:jlz@nyserd.org). Contact the Motor Challenge directly at (800) 862-2086 or visit the website at [www.motor.doe.gov](http://www.motor.doe.gov).

Several electric utilities recently formed the Northeast Premium Efficiency Motor Initiative to encourage sales of new and replacement premium efficiency motors. This program offers cash rebates to offset the higher purchase price of qualifying motors between one and 200 horsepower. For more information call (413) 785-5716 or (888) 45 MOTOR. ■

## Time Out and Turn Off: Timers and Occupancy Sensors

At night when you look out at the mosaic light pattern of the city, consider that, although most of the buildings have closed and are unoccupied, the lights are still on. Some lighting is necessary for security, but many businesses lose a considerable amount of money through overlighting. According to information provided by Noritas, Inc., inventors of occupancy sensors, during normal business hours, as much as 45 percent of lighting energy is wasted when spaces are unoccupied. Time-based and occupancy sensor controls for lighting offer ways to prevent wasted energy and money.

*"In New York City, timers and occupancy sensors are an important way for small to medium sized businesses to control demand charges."*

— Don Giampietro, New York City Department of Business Services

The most basic lighting control strategy is a timer. Timers are useful in both outdoor and indoor settings with predictable operating schedules. Typical outdoor situations include parking lot or security lighting. Indoor situations include lighting in production and manufacturing facilities that have predefined operating hours. Timer-based lighting also applies to indoor security and corridor lighting. Control devices range from simple timers to programmable sweep systems that establish a schedule for turning off lights throughout a floor or entire building.

An occupancy sensor determines if a space is occupied using ultrasonic or infrared sensors. When

### TIMER-BASED LIGHTING AVERAGE ENERGY SAVINGS

Applications	Energy Savings (%)
Offices (private)	→ 20-25%
Offices (open spaces)	→ 20-25%
Rest Rooms	→ 30-75%
Corridors	→ 30-40%
Storage Areas	→ 45-65%
Meeting Rooms	→ 45-65%
Conference Rooms	→ 45-65%
Warehouses	→ 50-75%

Source: U.S. Department of Energy, U.S. Environmental Protection Agency, Electric Power Research Institute

an occupant moves within a passive infrared occupancy sensor's range, the lights turn on. Passive infrared (PIR) sensors require an unobstructed view of the occupant and, therefore, do not work well where partitions may block direct viewing of occupants. However, they do not require an enclosed space and work well outdoors and in high-bay areas.

Ultrasonic controls continually emit high frequency sound waves, which bounce off everything in their range. If there is motion within the space, the lights will turn on. If no motion is detected for a fixed period of time, the sensor will switch area lights off. Ultrasonic controls operate best in enclosed areas with hard floors, walls and ceilings. They do not work well outdoors or in high-bay areas.

A hybrid sensor that incorporates both ultrasonic and infrared technologies is available to cover

If turning off the lights completely is impractical, or if your facility uses high-pressure sodium lamps, which have long restrike times, "dimming down" the lights may be another energy saving option. L.L. Bean, for example, installed two infrared occupancy sensors in its reserve warehouse. Now the lights are dimmed to 15-40% of their full light output for 70% of the day, when the warehouse is not in use. The cost of the project was \$125,000, but the payback period is less than three years.

Source: U.S. EPA Green Lights Application Profile

tricky applications, such as restrooms. In addition, both types of sensors can be set to stay on for any length of time after they are triggered, avoiding problems with lights turning off too often or too quickly.

Energy and cost savings, as well as payback, are dependent on the types of controls used, installation costs and the size of coverage area. Costs can range from \$30 to \$200 per system. Time-based controls are the least expensive control option and PIRs are usually less expensive than ultrasonic sensors.

### New York City vendors include:

- Leviton Manufacturing Company  
59-25 Little Neck Parkway  
Little Neck, NY 11362  
(800) 323-8920  
Fax: (800) 832-9538  
Tech Line: (800) 824-3004
- Superior Lamp & Electrical Supply Co., Inc.  
934-936 Broadway  
New York, NY  
(800) 544-4877  
Fax: (212) 529-3307

## 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 <sup>1</sup>	\$35.04	6 mos. – 1 yr.	\$24.33
Compact Fluorescent <sup>2</sup>	\$10.51	3 – 5 years	\$8.33
LED <sup>3</sup>	\$2.45	10+ years	\$1.04

<sup>1</sup>Two 20 W bulbs. <sup>2</sup>One 9 W bulb with 3 W adapter. <sup>3</sup>One 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.

***A facility in New York City with 100 exit signs can save more than \$5,500 annually in electricity and labor costs by investing in LED exit signs.***

Source: ENERGY STAR® Exit Sign Calculator

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,

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

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

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 New York, NY 10274-0156

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