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A dim future for standard lightbulbs

By Sandy Bauers

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High above Philadelphia, on the 25th floor of the Cira Centre, Tom Sperry grinned sheepishly. "I've just been informed I'm a wasteful tyrant," he said.

Never mind that his office has efficient fluorescent lights. Or that a motion sensor turns them off whenever he leaves.

It's just that in an identical office one floor up, where Matt McKeever works, the room is every bit as bright but uses half the energy.

A sensor the size of a quarter measures the daylight coming in the window and brightens or dims the lights accordingly.

McKeever's office is but one small part of an ever-brighter future of lighting in America. With all respect to New Jersey's favorite son, Thomas Edison, it seems that 128 years of incandescent bulbs are enough.

That's why kids all over the region badger their parents to switch to compact fluorescent bulbs, or CFLs.

That's why many municipalities, such as Nether Providence in Delaware County, are installing traffic signals with light-emitting diodes, the new U.S. standard. (Look for dots of light instead of an orb.) With the energy saved, said Township Commissioners' President Lin Floyd, "we will recover our costs in 2 1/2 years."

And it explains why labs across the United States are revving up lighting research — to the tune of \$71 million in congressional appropriations for the Department of Energy in the last five years.

Maybe, as national energy expert Bill Prindle says, lighting is at a "tipping point." Or it occupies what Kateri Callahan, of the Alliance to Save Energy, terms "a sweet spot" of technology and public awareness.

Either way, lighting as we know it is changing forever. And it's about time.

"We've already trimmed most of the fat off our appliances," said Noah Horowitz, a scientist with the National Resource Defense Council. Refrigerators and washers are nearly maxed.

Yet for more than a century, lighting has plodded along, shoving electricity through a filament to make it glow. Only about 5 percent of the energy makes light; the rest is heat.

With new technology, "you're talking about cutting power use by 75 percent," Horowitz said.

That can be huge when, according to DOE statistics, 30 percent of all the energy consumed in U.S. businesses and residences goes for lighting.

The first major improvement came with fluorescent bulbs like the ones in Sperry's office. They debuted at the 1939 World's Fair.

They were great for withstanding the vibrations of manufacturing facilities, but they weren't pretty. Or versatile.

Recently, Lutron, a Lehigh County company, figured a way to dim them, and its "EcoSystem" is what McKeever has.

McKeever and Sperry's company, SCA Americas, is giving the system a one-year "test drive" by comparing the lighting systems in two otherwise identical offices.

Lutron predicted savings of up to 60 percent. Architect Peter Levasseur, of EwingCole, was skeptical. Until he read the dual meters. The lights upstairs were using 67 percent less energy. "Incredible," he said.

EcoSystem is going into some of GlaxoSmithKline's offices in Philadelphia. And at the urging of U.S. Sen. Barbara Boxer (D., Calif.), who has introduced legislation to make federal buildings energy efficient, it's being installed in her Capitol offices and a few others.



PETER TOBIA / Inquirer Staff Photographer

On the 26th floor of Cira Centre, this office uses half as much energy as the identical office below it. A device dims its lighting based on outside conditions.

A swirl of innovation

In U.S. homes, the darling of the moment is the CFL. The light is a long fluorescent tube except that, like a magician's balloon, it's twisted into a swirl.

True, when the new bulbs came out a decade ago, they were big, they flickered, the light was unpleasantly sallow.

Today, the newest ones are small, they turn on instantly, they can be dimmed. And the light is more true.

Plus, they use about one-third the energy of an incandescent.

CFL sales now approach 200 million bulbs a year.

If this keeps up — if everyone in the U.S. replaced one incandescent with a CFL — the savings could light 2.5 mil-

lion homes for a year, according to the DOE.

To illustrate the point, Delaware Valley Earth Force is bringing a bicycle-style generator to a May 6 community event, and children will get to see how much pedal-power it takes to light a CFL compared with an incandescent.

“We expect them to have a memorable experience,” said executive director Janet Starwood.

The hurdle for CFLs is their purchase cost — maybe \$2 versus 25 cents for an incandescent. But advocates claim a CFL will save \$35 or more in operating costs over its lifetime.

People who get suckered into incandescents because of the low up-front cost are, in effect, “using Hummers in their homes,” said Philips Lighting Co. spokesman Steve Goldmacher, likening bulbs to cars.

Another drawback is that CFLs contain mercury, a neurotoxin. Conscious of consumers’ concern, manufacturers have worked to lessen the amount, and recycling options are emerging. Earlier this month, Ikea announced it was placing bulb-recycling bins in all its stores.

Support for CFLs is so strong that officials in Australia and California have called for an outright ban on incandescents. Canada announced Wednesday that it will ban their sale by 2012.

In New Jersey, Assemblyman Larry Chatzidakis (R., Burlington) has introduced legislation to require CFLs for all state offices. “We’re talking about desk lamps, hallways, chandeliers.”

In March, Philips Lighting Co. and several environmental agencies announced a coalition to phase out incandescents, saying that by the end of a 10-year transition period the U.S. could save \$18 billion a year in electricity bills and the energy output of 80 coal-fired power plants.

The rest of the industry isn’t abandoning incandescents just yet. GE would like the government to set efficiency standards and let the myriad types of bulbs duke it out in the marketplace. GE just happens to have in the pipeline an incandescent that



PETER TOBIA / Inquirer Staff Photographer

Maximum use of natural daylight is the objective behind the innovative system in the Cira Centre office of SCA Americas.

would be twice as efficient as today’s.

LEDs for household use

Meanwhile, halogens are improving. Philips promises one by October that is 30 percent to 50 percent more efficient than an incandescent, plus it’s dimmable.

In five or so years, when all those CFLs finally burn out, researchers expect to have LED lighting for household use.

The bulbs will be super-efficient and will last longer than your roof. “Put it in and forget about it,” Goldmacher said.

They just have to figure out how to put the bulb atop a standard screw-in base and get the hue of the light right. At the moment, it’s a tad blue.

On the horizon are OLEDs - organic light emitting diodes — that can be incorporated into walls and ceilings. They are basically sheets of light made from thin layers of organic material sandwiched between two electrodes.

Other researchers are working on

Lighting the Way

Compact fluorescent lamps are more efficient than traditional incandescents or standard straight-tube fluorescents.

Type of bulb	Efficiency (lumens per watt)*	Lifetime (hours)
Standard incandescent	10-17	750-2,500
Straight-tube fluorescent	30-110	7,000-24,000
Compact fluorescent lamp	50-70	10,000

SOURCE: U.S. Department of Energy

*One lumen equals the amount of light that falls on one square foot of surface from an international candle located one foot away.

innovations like solar collectors to gather light and pipe it into buildings via fiber optics.

“The technology is moving so quickly,” said Richard Karney, of the DOE. “It’s been a fantastic acceleration.”

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