



In 1941, General Electric was experimenting with fluorescent lamps, precursors to today's new compact fluorescent light bulbs.



# BRIGHT IDEA!

## The “NEW” compact fluorescent light bulb

By Shannon Brescher Shea

**F**ew inventions capture our imaginations more than the light bulb. Used for everything from setting the mood to symbolizing a new idea, light bulbs are engrained in our daily lives. So why is everyone trying to convince us to switch from traditional incandescent bulbs to new compact fluorescent ones? Because fluorescents point the way to a bright new future.

Compact fluorescent light bulbs (CFLs) are energy efficient, creating benefits for both the consumer and environment. When used for general household lighting, an ENERGY STAR® CFL uses about 75 percent less energy than its incandescent counterpart. Given that the average house contains approximately 45 light bulbs, this can translate into tremendous savings. In addition, CFLs can last up to ten times longer than incandescents, saving more than \$30 per bulb.

This efficiency also decreases the amount of pollution created in producing that energy. For example, when coal power plants generate electricity, they emit carbon dioxide and other pollutants that accelerate climate change, cause smog, and aggravate respiratory diseases. Since New York receives 12 percent of its power from coal, reducing our personal energy use can lessen energy production’s negative effects on the environment and human health.

Although fluorescent lights were unpopular in the past, improvements in design have increased CFLs’ desirability. Current incandescent bulbs continue to operate on Thomas Edison’s design principles. The electricity flows through a tungsten wire, which heats and produces light. However, in CFLs, electricity runs through gases and a small amount of mercury (less than



General Electric Engineering's C.A. Nickle, a significant contributor to the development of fluorescent lamps, viewing a fluorescent lamp in 1941.

5 mg in ENERGY STAR® CFLs). The vapors produce ultraviolet light, which changes into visible light when it strikes a coating inside the bulb. The original fluorescent tubes flickered and buzzed because they relied on a pulse of electricity. In contrast, modern CFLs have a near constant flow of electricity that produces a quiet,

consistent glow. Developments in technology have also lowered their price, making them more affordable than incandescent bulbs over time.

Perhaps the most important improvement to CFLs is that changes in their coating have made their light both brighter and “warmer.” Despite their previous reputation for producing harsh

and glaring light, experts say that for general lighting purposes, the quality of today’s CFLs can actually exceed incandescents. Rensselaer Polytechnic Institute’s Lighting Research Center has conducted studies that show people actually prefer well-chosen CFLs to incandescent ones. Referring to the belief that fluorescent bulbs produce a “cold” light, Director Mark Rea said, “It’s not true that you have to freeze in the dark with fluorescent lighting.”

However, before replacing all of your incandescents, there are a few points to consider when buying and installing CFLs. Because of their design, CFLs work best in places that have good air flow, like table and floor lamps. They also last the longest in areas where the lights are on for more than fifteen minutes at a time. When choosing which CFL to buy, keep in mind that different types of lights suit different purposes. The highest quality lights have a high color rendering index, or CRI. For the best light, Rea recommends looking for CFLs with a CRI of 80 or higher. “Soft white” or “daylight” bulbs have the most natural color. If you want to attach a CFL to a dimmer switch, be sure



### Let there be light

Since its creation by Thomas Edison in Menlo Park, New Jersey in 1879, the light bulb has undergone a number of changes. Many of the innovations that make the incandescent bulb what it is today came out of General Electric’s laboratory in Schenectady, New York.

The first major advance was crafting a tungsten filament, the wire the electricity heats to create light. When Edison first invented the bulb, he used a carbon filament which has a much shorter lifespan than tungsten. Although others attempted to make the thread out of tungsten, they found it too brittle to mold into the needed shape. However, working in the Schenectady laboratory, Dr. William Coolidge discovered how to increase the wire’s flexibility in 1909. To this day, manufacturers continue to use tungsten in incandescent lights.

Dr. Irving Langmuir, another scientist in Schenectady and a Nobel Prize-winner, made two other major discoveries. A significant problem with light bulbs was that they blackened as the filament burned, decreasing the amount of light produced over time. In 1912, Langmuir realized that if you filled the bulbs with a neon-like gas, you could prevent this effect. He also developed the technique of coiling the filament, which doubled the bulb’s lifespan.

In addition to incandescent bulbs, the Schenectady laboratory also played a role in the development of the compact fluorescent light bulb. Although the “spiral” fluorescent was officially invented in an Ohio General Electric laboratory by engineer Ed Hammer, Dr. Gorton Fonda in Schenectady played a key cooperative role in its development. Unfortunately, when it was created in 1976, the company decided it would be too expensive to mass produce. Thanks to modern technology, fluorescent bulbs are now both economically and environmentally smart.

**Chris Hunter**, Director of Archives and Collections at the Schenectady Museum & Suits-Bueche Planetarium, provided the historical background for this article.

Perhaps the **most important improvement** to CFLs is that changes in their coating have made their light both **brighter and “warmer.”**

to buy a specially labeled bulb, as not all of them have that ability. Rea emphasized that a few minutes spent choosing the correct bulb for your needs can greatly increase your future satisfaction.

With so many benefits associated with today’s CFLs, the government is encouraging consumers to modify their household lighting. NYSERDA recently passed its pledge goal for the ENERGY STAR® “Change a Light, Change the World” campaign. Through the campaign, run by the Environmental Protection Agency, New Yorkers pledged to replace 101,337 incandescent bulbs with CFLs. These changes will save \$2.6 million on energy bills and prevent 41 million pounds of greenhouse gases from entering the atmosphere! Similarly, the national Energy Bill requires light bulbs by 2012 to produce the same amount of brightness as current incandescents but use about one-third less energy. As CFLs are the most common lights on the market that already meet this requirement, it seems as if their popularity will only continue to increase.

So next time one of your incandescent bulbs burns out, why not consider replacing it with a compact fluorescent light bulb? The

many benefits make the switch as easy as turning on a light!

**For further reading, see:**

NYSERDA: [www.GetEnergySmart.org](http://www.GetEnergySmart.org)  
Energy Star Lighting: [www.energystar.gov/index.cfm?c=lighting.pr\\_lighting](http://www.energystar.gov/index.cfm?c=lighting.pr_lighting)

The Best Compact Fluorescent Light Bulbs May 2007

*Popular Mechanics*: [www.popularmechanics.com/home\\_journal/home\\_improvement/4215199.html](http://www.popularmechanics.com/home_journal/home_improvement/4215199.html)

*Outside* magazine Code Green: Screw the Right Thing May 2007  
<http://outside.away.com/outside/culture/200705/code-green-compact-fluorescent-lightbulbs-1.html>

**Shannon Brescher Shea** is a staff writer for *Conservationist* and a graduate of Cornell University’s Natural Resources/Communication programs.

Susan L. Shafer



Compact fluorescent bulbs screw into a typical socket.



## If a CFL breaks...

Do not use a vacuum to clean it up. Rather, ventilate the room for at least 15 minutes, use a damp paper towel to clean up broken glass and powder, and place the materials in a sealed container. For additional information to ensure a safe cleanup, please refer to the Department of Environmental Conservation’s (DEC) website: [www.dec.ny.gov/chemical/8787.html](http://www.dec.ny.gov/chemical/8787.html). Similarly, when a CFL burns out, do not throw it out. Instead, contact your town’s recycling coordinator, as most communities accept these bulbs during their Household Hazardous Waste Collection events (listed on DEC’s website: [www.dec.ny.gov/chemical/8780.html](http://www.dec.ny.gov/chemical/8780.html)). In addition, some towns are coordinating with local stores to collect and recycle them. Recently, the DEC and the New York State Energy Research and Development Authority (NYSERDA) have teamed up to encourage businesses that sell ENERGY STAR® products to become CFL Collection Centers, which will expand the number of disposal options for homeowners.