

Michaels Engineering Energy Brief

CFLs - MORE THAN MEETS THE EYE

SUGGESTIONS...

Do you have certain Energy Efficiency topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future Energy Brief!

DID YOU KNOW...

...According to the Wall Street Journal, there are 4 billion incandescent bulbs in use today, and the annual savings per bulb replaced with CFL is \$4.50 per year.

...The cost of a coal-fired power plant is approximately \$2,000 per kW.

MEET THE AUTHOR



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→ HOT DEBATE

As everyone who lives in the civilized world knows, there is an ongoing heated debate between environmentalists and free-market capitalists over energy policy. The fossil-foe environmentalists advocate carbon caps, renewable energy, and a moratorium on coal-fired power plants. The capitalists, who's answer to every energy crisis is to dig for more coal and drill for more oil, do not want these things, in addition to not wanting any mandates or regulations from Washington.

The best solution is likely in the middle ground. But in this Brief, we are going to focus on the pro-driller/diggers point of view.

→ THE CFL GRIPE

The pro-driller/digger crowd whines that the recently passed energy bill, which includes a phase-out of the incandescent light bulb, forces people to buy a more expensive product. They even give the fossil foes a sucker punch by arguing that compact fluorescent bulbs (CFLs) contain mercury whereas incandescent bulbs do not. These are both bogus arguments.

→ ECONOMICS

According to the Wall Street Journal, there are 4 billion incandescent bulbs in use today, and the annual savings per bulb replaced with a CFL is \$4.50. The 4 billion number seems reasonable considering the utility industry assumes there are 25 incandescent bulbs per home. The extra cost for the CFL continues to drop and is currently a measly \$2.25 according to utility sources.

Taking a substantially conservative savings of \$2.25 per CFL per year, there is a 1-year payback for the end user. But this is only the tip of the iceberg.

A massive conversion of 4 billion sockets to CFLs will result in a huge avoidance of power plant construction. With each operating bulb resulting in 50 Watts of savings, and assuming an industry standard that 30% will be operating during a peak day in the summer, we have a potential demand savings of 78,000 megawatts (MW). A megawatt is enough to serve about 750 homes. To put this in perspective, the Department of Energy estimates 70,000 MW of new generation, including all forms, fossil, renewable, and hydro in the next four years. Imagine that! A "permanent" conversion to CFLs will result in a reduction in the base generating load. Coal-fired power plants make up the majority of base load generation. The cost of a coal-fired plant is approximately \$2,000 per kW. A simple financial summary is provided below. You can draw your own conclusions.

→ MERCURY

Yes, all CFLs contain mercury, which is essential to their operation. A compact fluorescent bulb contains 5 milligrams on average. Per the EPA, mercury emissions per kWh are roughly 0.016 mg/kWh. Doing the math, a CFL will reduce mercury emissions from power plants by twice the amount of mercury contained in the bulb. And, the key phrase is "contained in the bulb", which can be recycled. Power plant

→ CONCLUSION

From an economic, environmental, and NIMBY (not in my back yard) standpoint, the case for a mass conversion from incandescent to compact fluorescent bulbs seems overwhelming. Why? Because incandescent lighting is horribly inefficient.



CFL Savings Summary	
30 Year Energy Savings	\$270 Billion
Avoided Power Plant Costs	\$156 Billion
Total 30 Year Savings*	\$426 Billion
Total 30 year cost	\$24.2 Billion
Simple Annual Rate of Return	1761%