

The Once and Future CFL

THE FUTURE OF EFFICIENCY
FOR HOMES



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For most people, compact fluorescent light bulbs (or CFLs) are the face of energy efficiency. This is not surprising, given that the CFL has utterly transformed energy efficiency over the last decade. The rise of the CFL has enabled massive savings for energy efficiency programs, and has greatly expanded the reach of energy efficiency efforts by serving as a low cost, first point of entry for consumers looking to reduce their electric bills.

Key Insights

- CFL bulbs will continue to be the most widely accessible and affordable energy efficiency opportunity for homeowners
- The potential for home energy savings from lighting is still quite large: In Vermont, energy efficient bulbs are present in just 33% of light sockets
- As the lighting market continues its rapid evolution, oversight and testing by regulatory authorities (such as ENERGY STAR[®]) will play a critical role in guiding consumer choices

If we want to continue realizing savings in the residential market, the reign of the CFL is by no means over. Although there are a range of residential efficient lighting products that will present further opportunities for savings, the CFL still has great potential because of its relatively low cost and accessibility to consumers. As we transition to other efficient products in the future, it has also provided energy efficiency programs with a valuable framework for understanding how to better engage consumers with their energy use.

The Rise of the CFL

The CFL is the iconic symbol of energy efficiency. It stands for the simplicity of the movement: the investment, the innovation, and the reward. But the leap of faith from incandescent to CFL meant abandoning over 100 years of reliance on a single emblem of light and an established home experience. The persistence of the incandescent can largely be attributed to its reliability and ubiquity, and the impact it had on the direction of our human experience. Over the last century, incandescent light bulbs influenced not only our relationship with our homes, but also the design and development of our communities, and the way that we structure our lives.

So why change? Ninety percent of the power consumed by an incandescent is emitted as heat. That means that only 10% of power consumption ends up as light we see. We accepted this fact for over a century. As a new paradigm of limited resources has begun to emerge, humans have recognized the need to be more thoughtful in our energy consumption and develop new technologies such as the CFL.

The CFL had a rocky start. The new technology was sent out into the market by many different manufacturers with little consistency. Characteristics between products were very different as well, especially in comparison with the incandescent bulbs that they were supposed to replace. By the time regulatory agencies and quality testing bodies began their work to ensure the overall quality of CFLs, the public was already having mixed experiences. The result is that even now, when the industry as a whole has learned from its mistakes, it has taken a good deal of effort to regain the trust of consumers. However, CFLs have great potential to save energy and money; a CFL uses one-fifth to one-third of the amount of energy that an incandescent uses and lasts almost five times as long.

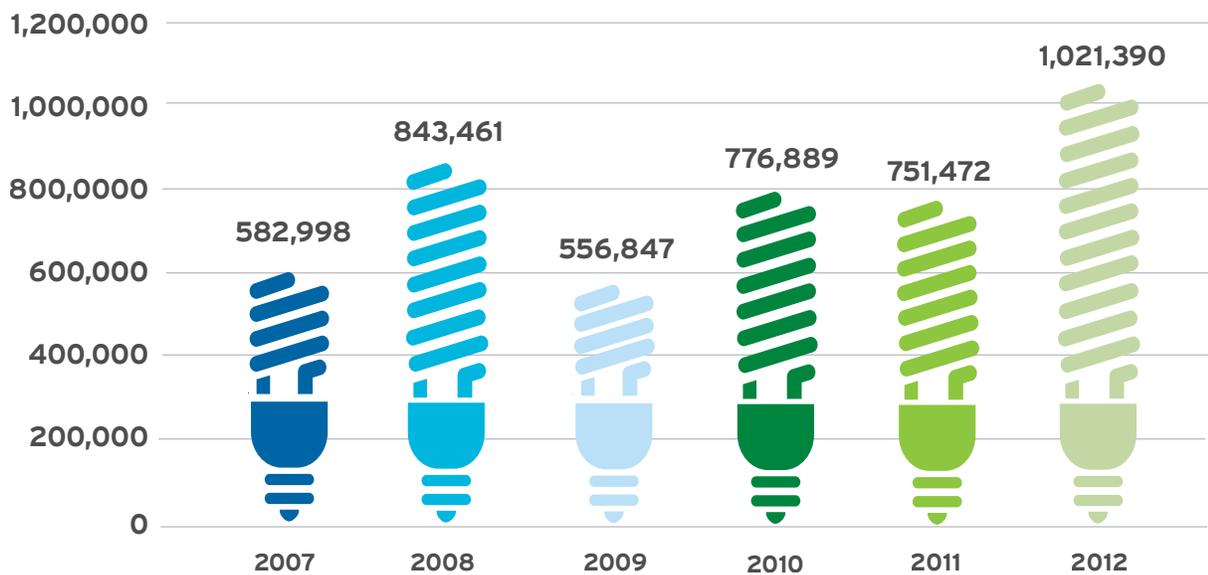


What Lighting looks like Today

After many years of research and development of quality assurance mechanisms, the ENERGY STAR label is the key indicator of quality for CFLs and other lighting products. The ENERGY STAR certification process requires strict third party testing from accredited labs. The labs test for a multitude of performance standards from longevity and appearance to a bulb's ability to accurately represent colors. Over the last decade CFL technology has not stagnated: A CFL today has better dimming capabilities, contains much lower mercury content (less than a can of tuna), and offers a customer the choice of warmer or cooler light tones. More and more, Americans are moving beyond the hesitancy created by their first experiences with CFLs, and the bulbs are now considered a trusted and mainstream light source.

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Over the last decade, Vermonters have installed CFLs in record numbers, as a way to realize immediate and cost-effective savings on their electric bills. On average, CFLs save between \$26-42 over their lives. With a typical home containing 44 light sockets, significant savings add up quickly. Efficiency Vermont has provided incentives on ENERGY STAR bulbs for over a decade, by buying down their upfront cost so that consumers pay a reduced price without having to submit a rebate form. In the last six years alone, this has helped Vermonters purchase 4.5 million CFLs and save 269,000 MWh of electricity.



Number of units incentivized in Vermont

The Impact of LEDs

What about Light Emitting Diodes (LEDs)? The rapid advancement of lighting technology is embodied in the development of LEDs over the last five years. LEDs are already slightly more efficient than CFLs, and their performance and applicability are impressive. LEDs are advancing quickly and the ENERGY STAR brand does lead consumers to tested products that will perform-but there are still drawbacks to the technology, particularly for residential customers.

Although prices are dropping quickly, LEDs still have a very high upfront cost that makes them difficult for most consumers to purchase. With an average cost of about \$25 for a standard 60W equivalent bulb, LEDs are much more expensive than CFLs, which cost \$3 on average. That upfront cost can be brought down with big incentives from programs like Efficiency Vermont, but costs are still high. Additionally, higher incentives on each individual bulb translate to a lower number of bulbs that can be subsidized by a fixed efficiency program budget.

Ultimately this high subsidy approach ensures that a only smaller portion of early adopters are able to find bulbs at a limited number of locations, and are able to purchase them at relatively high cost. This would leave the vast majority of consumers searching for LEDs at the local general store or hardware store where they have always made their lighting purchase. It might even be the case that such bulbs are not available in their county or town. CFLs, however, are available across the state for a low upfront cost and still provide significant energy savings.

As more manufacturers hone in on consumer interest in LEDs, it is also very easy to find non-ENERGY STAR bulbs that might start at a low cost but fail in a year or not perform as desired. Without the ENERGY STAR label, there is no guarantee that they will perform as advertised, and yet consumers are being flooded with erroneous claims and substandard products. LEDs are a big investment for the average consumer, and it is important to ensure they can trust this new technology. At Efficiency Vermont, we work very closely with all national and local lighting retailers and manufacturers across the state to ensure that ENERGY STAR LEDs are available in all shapes and sizes as soon as they become available, and for prices that are as reasonable as possible. In fact, because of the requirements we set for performance and our level of engagement with retailers to promote efficient lighting, many major manufacturers are sending the best of their new LED technology to Vermont.

Why we still focus on CFLs

In the most recent Vermont Existing Homes Evaluation,¹ only 33% of light sockets in the state were filled with CFLs—and 67% had incandescents. That means there are a lot of Vermonters still spending a lot more money than they need to on their lighting. High quality CFLs are available in every shape and size at retailers in every community. The average price of CFLs has dropped from \$17 to \$3 over the last two decades² for a standard 60W equivalent bulb. Since the high upfront cost of most efficient technologies is the

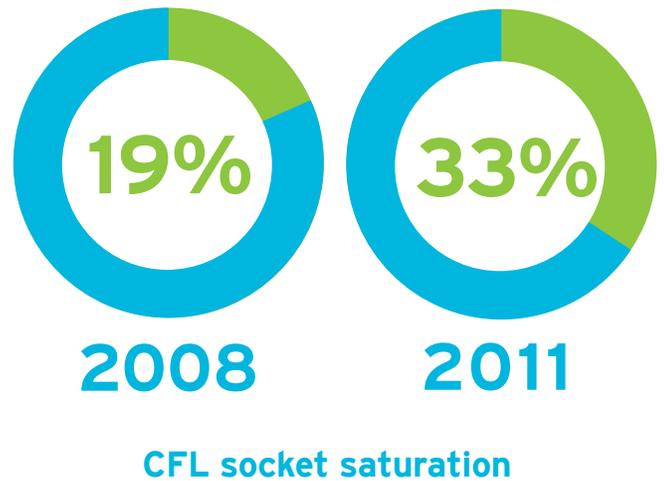
“LEDs are advancing quickly and the ENERGY STAR brand does lead consumers to tested products that will perform-but there are still drawbacks to the technology, particularly for residential customers”

¹Vermont Single-Family Existing Homes Onsite Report (NMR Group, et al: 2012)

leading barrier, the accessibility and low cost of CFLs to all Vermonters is extremely important. By applying a smaller incentive to more bulbs, Efficiency Vermont can ensure that they are affordable and accessible to many more Vermonters.

CFLs have become an important opportunity for energy efficiency in low-income homes—especially through the partnership that Efficiency Vermont has built with the Vermont Foodbank. Thirty nine percent of Vermont households are considered low income and on average they spend roughly 15% of their household income on energy. That’s more than twice the national average. For the last four years, we have sent energy-efficient CFLs directly to the Foodbank’s central warehouse to be distributed to those in need across the state. With roughly 280 partner food shelves and pantries throughout Vermont, the reach of this effort is significant. We can reach this many customers only by employing the CFL: LEDs are simply too expensive to be distributed cost-effectively on such a wide scale.

Ensuring equity, accessibility, and affordability to all Vermonters will always continue to be a key goal of Efficiency Vermont’s lighting program. We work to make high quality lighting technologies available in local retailers where people traditionally look for bulbs, and we work to keep the price point at a level that most Vermonters can afford. Even though LEDs are improving, and their cost continues to drop, it is important to support current efficient technologies that are already available, accessible, and affordable everywhere in the state. The CFL has a key role to play in Vermont’s energy present – and future.



Lara Bonn is Manager of Efficiency Vermont’s Retail Efficient Products Program. She oversees the design, development, and implementation of initiatives serving a range of Vermont markets, with a strong emphasis on bringing efficient lighting, appliances, and consumer electronics to residential customers. Under her watch, Efficiency Vermont’s nation-leading residential lighting program has expanded significantly, including exploring new market channels and program models, and achieving record savings in 2012. Lara has more than 13 years of experience in the environmental and energy efficiency fields. Prior to joining Efficiency Vermont, she worked as a consultant with Optimal Energy, advising utilities across the country on energy efficiency program implementation, and served as a senior consultant to the U.S. Environmental Protection Agency. She has delivered numerous presentations and papers through organizations including ACEEE, NEEP, CEE, and the EPA. She received her bachelor’s degree from Colby College and is a certified Business Energy Professional.

²CFL Market Profile (U.S. Department of Energy: 2009)