

## Lighting Options for Your Home

With the phase-out of many popular incandescent lamps, you need to consider new options for replacing them...



**NEMA**<sup>®</sup>  
Setting Standards for Excellence

**enlighten America**<sup>®</sup>  
lighting the way to savings

# Lighting Options for Your Home

**YES** - some of today's most popular incandescent bulbs are going away!

## HERE'S WHAT YOU NEED TO KNOW....

By the Lighting Systems Division of the National Electrical Manufacturers Association.  
Permission is granted by NEMA to reprint in whole or in part or to quote portions of this document without changes.

Some of you may have heard or read that incandescent light bulbs are going away. That is partly true.

In 2007 then President George W. Bush signed the Energy Independence and Security Act (EISA) into law. The provisions in this law are intended to reduce energy usage and greenhouse gas emissions and enable the U.S. to be less dependent on foreign sources of energy. One of the provisions provides for phasing out today's 40W, 60W, 75W and 100W general service incandescent light bulbs in favor of lower wattage, energy saving bulbs. This is important to you, the consumer, because lighting accounts for about 15% of the electrical use in homes.



**GENERAL SERVICE INCANDESCENT LIGHT BULBS** are basic light bulbs with medium screw bases; finishes including clear, inside frosted and soft white; provide one level of light and operate at 120 - 130 Volts. You use them in a variety of applications in and around your home such as overhead light fixtures, wall sconces, table and floor lamps, fan light kits, outdoor entrance fixtures and post top decorative lanterns.

The law provides for a three year phase out schedule that will start with today's 100W light bulbs in 2011 in California and in 2012 in the other 49 states and territories. The 75W light bulbs will go away in year two and the 60W and 40W light bulbs will go away in year three. The law also sets minimum standards for general service incandescent light bulbs, making it necessary for you to replace the popular incandescent bulbs with more energy efficient versions.

Current Wattage	Maximum Rated Wattage	Effective Date for California (Manufactured on or after)	Effective Date for 49 states (Manufactured on or after)
100W	72W	January 1, 2011	January 1, 2012
75W	53W	January 1, 2012	January 1, 2013
60W	43W	January 1, 2013	January 1, 2014
40W	29W	January 1, 2013	January 1, 2014

The lower wattage limits set by the new standards will use about 30% less energy than the old incandescent wattages they are replacing. That will mean lower energy costs to operate the new bulbs and fewer greenhouse gas emissions. For the first time, federal law sets a minimum rated life of 1,000 hours for general service incandescent light bulbs.

The **RATED LIFE** is the number of operating hours when half of the bulbs in a group have failed and half are still operating with all bulbs operated as designed.

You have three technology options for replacing the incandescent bulbs.

### HALOGEN

New halogen bulbs will be in wattages similar to the new maximum rated wattages in the chart (see previous page) and they will look like the incandescent bulbs you are used to buying. Halogen is really a more energy efficient form of incandescent, so these bulbs can be used in any application where you have been using incandescent bulbs. They will use about 30% less energy, deliver a pleasing incandescent light, are dimmable and are mercury-free. These new halogen bulbs are available today.




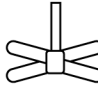



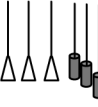








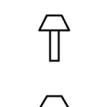
### COMPACT FLUORESCENT (CFL)

Compact fluorescent (CFL) bulbs are another option. CFL bulbs are made to produce different colors of light. They are rated in terms of the color appearance of the light they emit. These values (2700K, 3000K, 3500K and 4100K, etc.) are numerical indicators of the appearance of the light emitted by the bulbs. If you want a warm, incandescent like light, choose a lamp designated 2700-3000K; if you want a cooler color of light that is more like the traditional crisp, white light of fluorescent lamps, choose one designated 4100K; if you prefer a more neutral color of light that is neither warm nor cool, choose one designated 3500K. To select the appropriate wattage CFL bulb, choose one that is about one quarter (1/4) the wattage of the incandescent lamp you want to replace. The advantages of CFL bulbs are that they use about 75 percent less energy and last from 6 to 16 times longer. CFLs use fluorescent technology, which means they contain a very small amount of mercury to ensure proper operation; however, as it relates to the environment as a whole, the mercury content in CFLs is more than offset by reduced mercury emissions from utilities that would otherwise be powering less efficient incandescent bulbs. They must be safely and appropriately disposed of in accordance with state and/or municipal hazardous waste ordinances. Not all compact fluorescent bulbs can be used in all incandescent applications. Be sure and check the packaging to see if the CFL bulb is suitable for use in your application including operation on incandescent dimmers, in enclosed fixtures or in outdoor applications. If the CFL bulb will be turned on and off frequently, its life will be reduced, but you will still realize the energy savings. When selecting a CFL bulb, look for the ENERGY STAR® logo on the packaging. As with appliances, the EPA sets standards for some lighting products to assure users of the quality of the energy saving products they are purchasing.




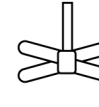



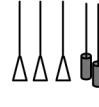








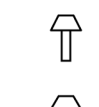
### SOLID STATE (SSL)

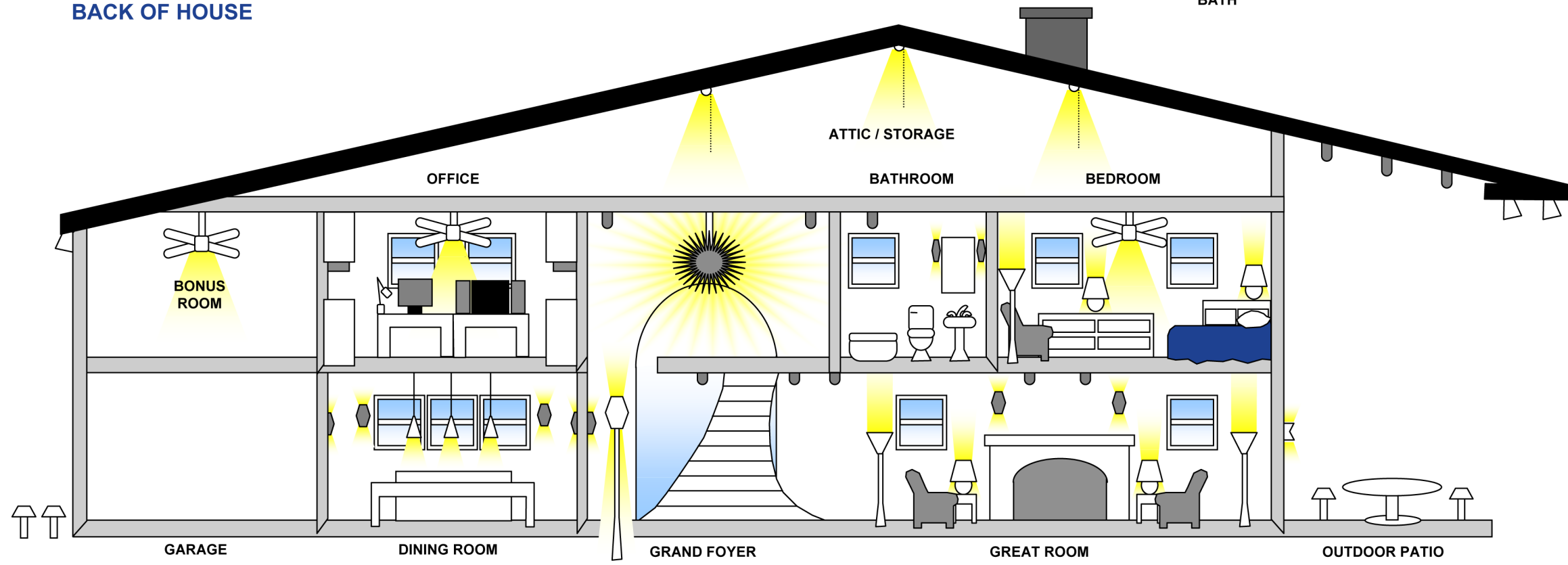
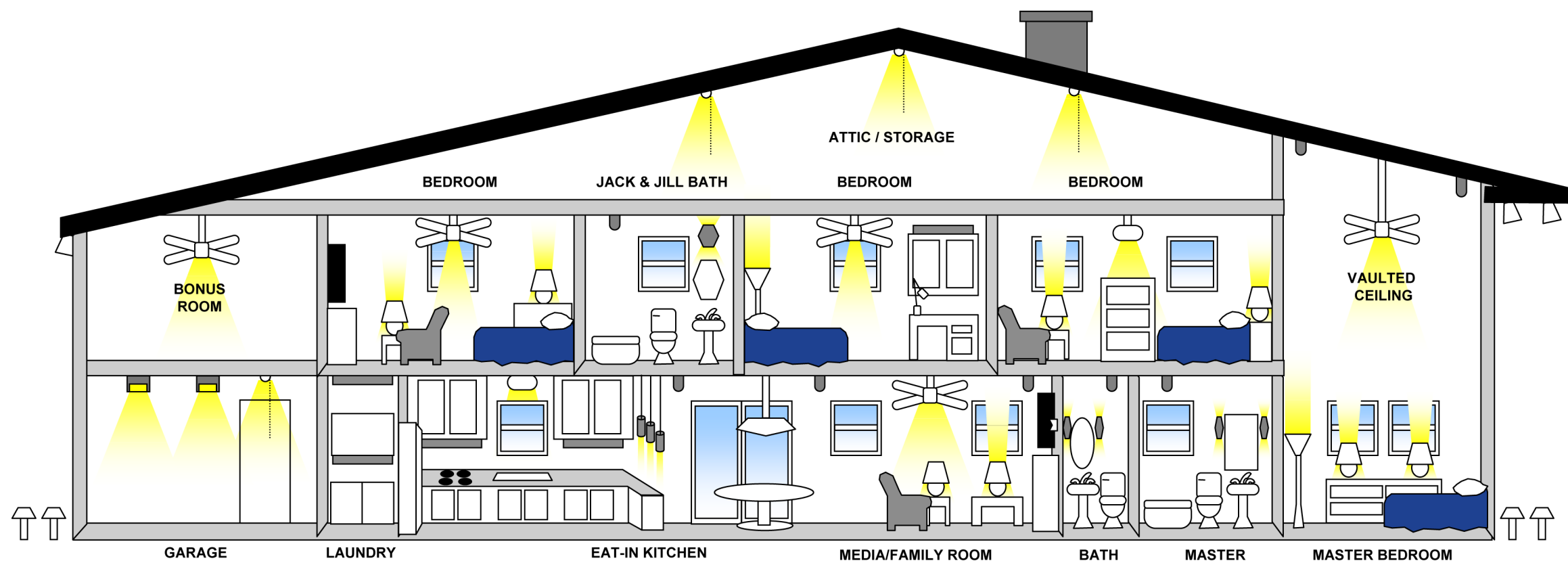
Solid state (SSL) bulbs are also an option. This newest family of bulbs uses LED technology and retailers are starting to carry them. Several companies make replacements for today's 40W incandescent bulbs and replacements for today's 60W incandescent bulbs will be available soon. Higher wattage replacements are in development. These bulbs will deliver about 80 percent energy savings and are mercury free. They have extremely long life - from 25,000 to 50,000 hours - compared to the incandescent bulbs they replace. While the energy savings is similar to CFL, bulb life is much longer. The EPA recently finalized ENERGY STAR® standards for these bulbs that go into effect on August 31, 2010. Start watching for the ENERGY STAR® logo on the packaging for these bulbs in the near future.

## Technology Options

-  **Foyer Chandelier - Decorative**  
Solid State LED lamps with dimmer controllability
-  **Overhead Light Fixture**  
Compact Fluorescent, Halogen or Solid State LED
-  **Incandescent**  
- unfinished attic, garage, basement areas with pull string  
Compact Fluorescent
-  **Ceiling Fan**  
Compact Fluorescent or Solid State LED
-  **Eat In Kitchen above table lighting**  
Halogen or Solid State LED with dimmer controllability
-  **Garage lighting**  
Compact Fluorescent, Halogen or Solid State LED
-  **Undercabinet lighting**  
Compact Fluorescent, Halogen or Solid State LED
-  **Pendant lighting**  
Compact Fluorescent, Halogen or Solid State LED with dimmer controllability
-  **Recessed lighting**  
Compact Fluorescent, Halogen or Solid State LED with dimmer controllability
-  **Table lamp lighting**  
Compact Fluorescent, Halogen or Solid State LED
-  **Torchiere lamp lighting**  
Compact Fluorescent, Solid State LED or 3-Way Incandescent
-  **Task lamp lighting**  
Compact Fluorescent, Halogen or Solid State LED
-  **Indoor wall sconce lighting**  
Compact Fluorescent, Halogen or Solid State LED with dimmer controllability
-  **Outdoor wall sconce lighting**  
Outdoor rated Compact Fluorescent, Halogen or Solid State LED
-  **Outdoor lighting attached to home**  
Outdoor rated Compact Fluorescent, Halogen or Solid State LED
-  **Landscaping lighting**  
Outdoor rated Halogen or Solid State LED
-  **Outdoor post lighting**  
Outdoor rated Compact Fluorescent, Halogen, or Solid State LED

## Technology Selected

-  **Foyer Chandelier - Decorative**  
3 Solid State LED
-  **Overhead Light Fixture**  
Kitchen: 2 Halogen  
Bedroom: 2 CFL
-  **Incandescent**  
Compact Fluorescent
-  **Ceiling Fan**  
3 Solid State LED
-  **Eat In Kitchen above table lighting**  
No changes made
-  **Garage lighting**  
1 Solid State LED per Garage Door Opener
-  **Undercabinet lighting**  
No changes made
-  **Pendant lighting**  
3 Halogen - 1 per Fixture
-  **Recessed lighting**  
No changes made
-  **Table lamp lighting**  
1 Compact Fluorescent
-  **Torchiere lamp lighting**  
1 Compact Fluorescent
-  **Task lamp lighting**  
No changes made
-  **Indoor wall sconce lighting**  
1 Halogen  
2 Halogen - Jack and Jill Bath
-  **Outdoor wall sconce lighting**  
1 Solid State LED
-  **Outdoor lighting attached to home**  
No changes made
-  **Landscaping lighting**  
No changes made
-  **Outdoor post lighting**  
1 Solid State LED



The household pictured above is not the typical U.S. household, but is one designed to give you an idea of all the applications for lighting used in American homes. The applications where general service incandescent bulbs would typically be used are highlighted with **yellow**.

## SAME LIGHT, FULLER WALLET, BETTER ENVIRONMENT...

The preceding household diagram may be hypothetical, but based on converting from 60 Watt incandescent bulbs to a combination of 43 Watt Halogen, 13 Watt Compact Fluorescent and 12 Watt Solid State (LED) bulbs that deliver similar light output (brightness) to the incandescent bulbs, the annual benefit for this household would be a saving of **3,118.56 kWh** and **\$343.04** on electric bills.

In addition, **4,182 fewer pounds of CO<sub>2</sub>** (carbon dioxide) would be emitted by the power plant supplying the household. These numbers are based on using each bulb 3 hours per day, 365 days per year and an electrical utility rate of \$0.11 per kWh.

## WATTAGE / LUMEN EQUIVALENCY

All the more energy efficient bulbs operate at lower wattages for similar light output. The wattages for equivalent light outputs are different depending on the technology of the bulbs. That will mean that you will now need to choose a light bulb based on the light output (brightness) of the bulb. The light output of a light bulb is measured in lumens. Today's 60W incandescent bulb delivers about 850 lumens; if that is the right amount of light you need, you will want to choose a replacement bulb that delivers a similar amount of light.

Today's Incandescent Wattage	Today's Incandescent Lumens (Light Output = "Brightness")	New Halogen Wattage	CFL Wattage	Solid State (LED) Wattage
100W	1690	70 - 72W	23 - 26W	
75W	1170	53W	18 - 20W	
60W	850	43W	13 - 15W	12W
40W	475	28 - 29W	10 - 11W	8 - 9W

For more information on energy efficient lighting for your home, we suggest you visit the Department of Energy (DOE) webpage:

[www.energysavers.gov/your\\_home/lighting\\_daylighting/index.cfm/mytopic=11980](http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11980)

You don't have to wait for the old incandescent bulbs to go away. Start thinking about where you use the incandescent general service bulbs in and around your home and consider replacing them with one or more of the replacement options. Go "green" and start reaping the benefits of reduced energy usage, reduced greenhouse gas emissions and longer bulb life today while saving money on your electric bills. Just think of the difference we will make when all of us are using these more energy efficient bulbs!



**Remember, you don't have to wait to start saving!**  
Three technology choices of energy efficient bulbs are available today. Don't delay. Start changing bulbs today to start saving today!

## Appendix

Not all U.S. households use this many general service incandescent bulbs. If we look at a typical U.S. household as defined in a 2002 study, these would be the benefits.

### Benefits for an average U.S. household:

60W Incandescent to Mix of New Options	
Energy Saved/Year	1295.385 kWh
Energy \$ Saved/Year	\$142.49
Pounds of CO <sub>2</sub> Eliminated/Year	1,737.1

Mix of new options:

Five 12W SSL, fourteen 43W Halogen and fifteen 13W CFL bulbs, all used 3 hours per day, 365 days per year at an electrical rate of \$0.11/kWh.

### Total benefits for all U.S. households (111 million):

60W Incandescent to Mix of New Options	
Energy Saved/Year	143,917,273,500 kWh
Energy \$ Saved/Year	\$15.8 Billion
Metric Tons of CO <sub>2</sub> Eliminated/Year	87.5 Million
Equivalent of Removing This Many Cars and Light Trucks from the Road	16.5 Million

## Resources

DOE webpage

[http://www.energysavers.gov/your\\_home/lighting\\_daylighting/index.cfm/mytopic=11980](http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11980)

U.S. Lighting Market Characterization 2002 Volume 1; Tables 5-2, 5-5 & 5-6.

EIA 2005 Residential Energy use Consumption Survey

[http://www.eia.doe.gov/emeu/recs/recs2005/hc2005\\_tables/hc13lightingindicators/pdf/alltables.pdf](http://www.eia.doe.gov/emeu/recs/recs2005/hc2005_tables/hc13lightingindicators/pdf/alltables.pdf)

DOE Carbon Dioxide Emissions from the Generation of Electric Power in the United States, July 2000

[http://www.eia.doe.gov/cneaf/electricity/page/co2\\_report/co2emiss.pdf](http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2emiss.pdf)

Pounds of CO<sub>2</sub> per passenger vehicle from EPA

<http://www.epa.gov/oms/climate/420f05004.htm>



**Prepared by:**  
Lighting Systems Division  
National Electrical Manufacturers Association (NEMA)  
1300 North 17th Street, Suite 1752  
Rosslyn, VA 22209

*Note: Information in this whitepaper is being made available by NEMA for use by utilities and other partners in order to provide consumers with accurate and timely information. We encourage use of the text and artwork by interested parties, provided NEMA is the attributed source.*