



# OPERATION CHANGE OUT MILITARY CHALLENGE

## Savings Statements:

(Revised April 10, 2008)

Operation Change Out offers significant savings potential within military housing. Changing just one incandescent light bulb to an ENERGY STAR qualified light bulb in every on-base housing unit in the United States would:

- Save 62.1 million kWh over the life of the bulbs, representing a substantial reduction in national energy use; enough energy to light about 32,000 homes for a year.
- Cut nearly \$7 million<sup>1</sup> in energy costs over the life of the bulbs, enough money to purchase more than a dozen mine-resistant, ambush-protected armored vehicles; and
- Prevent the emissions of more than 95 million pounds of carbon dioxide; the equivalent to taking nearly 1,500 cars off the road.

## Assumptions:

**Number of Military On-base Housing Units: 220,238**

Source: Testimony of Philip W. Grone, Deputy Undersecretary of Defense, Subcommittee on Military Quality of Life and Veterans Affairs, House Appropriations Committee, March 2, 2005. Available online as of April 9, 2008 at [http://www.acq.osd.mil/housing/ct05\\_grone.htm](http://www.acq.osd.mil/housing/ct05_grone.htm). References replacing 84% of military on-base housing units as 185,000 units.

**CFL wattage replacement: 13W CFL for 60W Incandescent**

Source: DOE market data

**Lifetime – Compact Fluorescent Bulbs: 6,000 hours**

Source: Current ENERGY STAR CFL specification minimum. Note: Many qualified CFLs exceed 6,000 hours – manufacturers may accurately assert higher hours on packaging.

**Annual household lighting use: 1,950 kWh / household**

Sources: Navigant 2002 (DOE EERE Office of Building Technology), "U.S. Lighting Market Characterization, Volume I: National Lighting Inventory and Energy Consumption Estimate." Cited number is in table ES-1, Pg 10.

## Electric Rates:

**(US, residential, average rate for annual savings): \$0.106 / kWh**

**(US, residential, average rate over CFL Lifetime savings): \$0.108 / kWh**

Source: Energy Information Administration's Annual Energy Outlook 2008, Reference Case Table 8, average residential electricity price for 2007 and projected average residential electricity price over 2008-2012 (based on 5.5-year lifetime of 6000-hour CFL used 3 hours per day), respectively; converted from 2006 dollars to 2007 dollars using the Bureau of Economic Analysis's GDP price deflator data, accessed at [www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&FirstYear=2005&LastYear=2007&Freq=Qtr](http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&FirstYear=2005&LastYear=2007&Freq=Qtr).

<sup>1</sup> Campaign materials developed before April 10, 2008 contained a \$6.25 million lifetime energy cost savings figure that was developed using the 2006 electric rate per assumptions for 2007 ENERGY STAR *Change a Light, Change the World* Campaign. The 2006 electricity rate previously used was \$.1008 per kWh. The new savings numbers, above, have been updated using the 2007 electric rates.

**Average cost of mine-resistant armored vehicles: \$520,000**

Source: "The truck the Pentagon wants and the firm that makes it," USA Today August 1, 2007 published price and quantity data. DoD spent \$3.382 billion for 6506 Mine Resistant, Ambush Protected vehicles, or MRAPs. Article access online at [http://www.usatoday.com/news/military/2007-08-01-force-protection-mraps\\_N.htm](http://www.usatoday.com/news/military/2007-08-01-force-protection-mraps_N.htm) on 12/5/07 and 4/3/08.

**Emissions factor:**

**1.54 pounds CO2 / kWh**

Source: EPA's Climate Change Action Plan (CCAP) number for 2008.

**Average daily usage:**

**3 hours**

Source: "An Evaluation of Residential CFL Hours-of-Use Methodologies and Estimates," Edward Vine, Lawrence Berkeley National Laboratory, Berkeley, CA and Diane Fielding, BC Hydro, Vancouver, Canada; August 2005. Also ENERGY STAR CFL criteria requirement for lifetime claims on packaging.

**Car Emissions:**

**12,037 pounds CO2/car/yr**

Source: EPA (2007). Greenhouse Gas Equivalencies Calculator. <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.