

Energy Savings Potential of Solid-State Lighting in General Illumination Applications

The U.S. Department of Energy (DOE) has developed a comprehensive strategy to accelerate the development and market introduction of energy-efficient solid-state lighting for general illumination. The energy savings potential of this technology is significant, and the U.S. will benefit by focusing our resources and maintaining our global leadership in this technology.

The DOE report *Energy Savings Potential of Solid-State Lighting in General Illumination Applications* forecasts the energy savings potential of solid-state lighting sources compared to conventional lighting sources (e.g., incandescent and fluorescent). Using an econometric model of the U.S. lighting market, two scenarios are evaluated—one considering light-emitting diodes (LEDs) and one considering organic light-emitting diodes (OLEDs). For brevity, and since the two scenarios have similar estimated savings potential, only the LED scenario is discussed below.

The projections of efficacy, retail price, and operating life are based on work conducted cooperatively between DOE and the Next Generation Lighting Industry Alliance, a solid-state lighting technical working group managed by the National Electrical Manufacturers Association.

- Under the LED scenario, in 2030 the annual energy savings from solid-state lighting will be approximately 190 terawatt-hours, or the equivalent annual electrical output of about 24 large power plants (1,000 MW electric). At today's energy prices, that would equate to approximately \$15 billion in energy savings in that year alone. Assuming the same mix of generating power stations, these savings would reduce greenhouse gas emissions by 31.4 million metric tons of carbon. The total electricity consumption for lighting would decrease by roughly 25 percent relative to a scenario with no solid-state lighting in the market—representing enough electricity to illuminate more than 95 million homes in the U.S. today.
- Over the 20-year analysis period, spanning 2010–2030, the cumulative energy savings are estimated to total approximately 1,488 terawatt-hours, representing approximately \$120 billion at today's energy prices. Assuming the electric power plant generating mix is held constant over the next two decades, these savings would reduce greenhouse gas emissions by 246 million metric tons of carbon.

To learn more about DOE Solid-State Lighting Portfolio activities, visit www.ssl.energy.gov.

Source: *Energy Savings Potential of Solid-State Lighting in General Illumination Applications* (February 2010), www.ssl.energy.gov/tech_reports.html.

DOE estimates based on Energy Information Administration's *Annual Energy Outlook*, 2008.