Advanced Lighting

US Industry Study with Forecasts for 2015 & 2020

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As traditional incandescent lamps are made illegal, advanced lighting products will do particularly well in the residential building market, where incandescent lamps have been dominant.

**US demand to rise 9.3% annually through 2015**

US demand for advanced lighting is forecast to increase 9.3 percent per annum through 2015 to $11.2 billion. A government-mandated phaseout of traditional incandescent lamps and a projected improvement in the cost effectiveness of advanced lighting will drive gains. As traditional incandescent lamps are phased out within two years, demand for advanced lighting products will do particularly well in the residential building market, where incandescent lamps have been dominant for more than a century because of their low cost and high quality of light. The elimination of these lamps will power growth in advanced lighting sales through 2015. But because advanced lighting products have much longer useful lives than incandescent lamps, the average replacement rate for residential lighting will decrease over time, eventually depressing advanced lighting demand.

**Lower costs to spur non-residential, outdoor uses**

In nonresidential building and outdoor lighting applications, traditional incandescent lamps account for a smaller share of the market, so the government phaseout will have less impact on advanced lighting demand. Instead, a projected decrease in the cost of advanced lighting, particularly for light emitting diodes (LEDs), will spur demand growth through 2015. Businesses, institutions and government entities will turn to advanced lighting products to lower energy expenses and to reduce the labor costs of replacing lighting products.

**LEDs to lead gains**

Demand for LEDs will grow the fastest of any advanced lighting product through 2015, rising nearly 15 percent per year to $6.1 billion. Increased penetration in the residential building market will support advances. While the EISA will also boost unit sales of compact fluorescent lamps (CFLs) and halogen lamps through 2015, over the long term LEDs are expected to take market share from these types. LEDs consume far less energy than halogens, do not contain mercury (unlike CFLs) and last considerably longer on average than halogens or CFLs. These advantages, combined with a rapid decline in unit prices, will eventually result in LEDs leading the residential market in both unit sales and value demand.

Sales of metal halide lamps (a type of high intensity discharge lamp) and halogen lamps will benefit from a projected rebound in motor vehicle manufacturing through 2015. Metal halide lamps will gradually increase their share of the motor vehicle market as more motor vehicle manufacturers begin to install metal halide headlamps as standard equipment.

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MARKETS

OEM & Aftermarket

Vehicular demand for advanced lighting derives from both OEM and aftermarket applications. The OEM segment accounts for the majority of demand, representing 69 percent of the total in 2010. Demand for advanced lighting in OEM applications is forecast to expand almost twelve percent per annum through 2015 to $735 million, outpacing aftermarket applications as a result of a projected increase in motor vehicle production.

Demand for advanced lighting in OEM applications is determined both by trends in the number of vehicles produced and by the types of lighting products initially installed on new motor vehicles. Domestic production of motor vehicles suffered between 2005 and 2010, as a weak macroeconomic environment depressed demand. Consequently, OEM demand for advanced lighting products declined between 2005 and 2010. Production of motor vehicles has already begun to recover and is expected to continue to expand through 2015, spurring OEM demand for advanced lighting.

Further boosting OEM demand will be a continued increase in the adoption of metal halide headlamps. Metal halide headlamps, which cost more than the halogen headlamps they typically displace, are expected to find greater use because of the superior visibility they offer drivers of motor vehicles. The value of advanced lighting products used per vehicle will also benefit from the greater use of LEDs in interior and exterior lighting. LEDs, which typically compete with incandescents, will see an increase in use as the price of LEDs decreases through 2015, making LEDs more cost competitive with incandescents.

Aftermarket demand for advanced lighting is a function of replacement demand and retrofit or upgrade demand. Replacement demand will likely remain flat through 2015, as motorists are generally content with the lighting products already installed. Retrofit or upgrade demand will be driven by the replacement of older halogen headlamps with metal halide headlamps. Ongoing increases in motor vehicle production in the United States will provide new installation opportunities for advanced lighting products in the aftermarket as well.

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<td>South GDP (bil $)</td>
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<td>$ lighting/mil $ GDP</td>
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<td>South Advanced Lighting Demand</td>
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<tr>
<td>By Subregion:</td>
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<tr>
<td>South Atlantic</td>
<td>640</td>
<td>1015</td>
<td>2630</td>
<td>4145</td>
<td>3735</td>
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<td>East South Central</td>
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<td>230</td>
<td>490</td>
<td>740</td>
<td>700</td>
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<td>West South Central</td>
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<td>300</td>
<td>850</td>
<td>1340</td>
<td>1190</td>
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<td>By Market:</td>
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<td>Nonresidential</td>
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<td>365</td>
<td>1015</td>
<td>1690</td>
<td>1300</td>
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<td>Residential</td>
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<td>125</td>
<td>845</td>
<td>1450</td>
<td>1215</td>
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<td>Motor Vehicle</td>
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<td>200</td>
<td>190</td>
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<td>345</td>
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<tr>
<td>Other</td>
<td>235</td>
<td>325</td>
<td>580</td>
<td>715</td>
<td>875</td>
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<tr>
<td>% South</td>
<td>32.5</td>
<td>35.2</td>
<td>36.8</td>
<td>37.2</td>
<td>37.2</td>
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<tr>
<td>Total Advanced Lighting Demand</td>
<td>1970</td>
<td>2885</td>
<td>7150</td>
<td>11150</td>
<td>10050</td>
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</tbody>
</table>

SAMPLE TABLE

CHART VII-1
ADVANCED LIGHTING MARKET SHARE BY COMPANY
($7.2 billion, 2010)
## COMPANY PROFILES

**Cree Incorporated**  
4600 Silicon Drive  
Durham, NC  27703  
919-313-5300  
http://www.cree.com  

- **Revenues:** $867 million (FY 2010)  
- **US Revenues:** $165 million (FY 2010)  
- **Employment:** 4,300 (FY 2010)  
- **Key Products:** light emitting diode chips, components and lamps  

Cree develops and manufactures semiconductor materials and devices based on silicon carbide, gallium nitride (GaN) and related compounds. The Company’s products include light emitting diodes (LEDs), materials, and high-power and radio frequency products.

The Company is active in the US advanced lighting market via the production of LED products, which accounted for $790 million of its total revenues in FY 2010. Among Cree’s LED products are chips, components and lamps. LED chips from the Company are blue and green products composed of GaN and related materials. These chips are employed in such end uses as cellular phone backlighting, digital camera flashes, traffic signals, automotive dashboard lighting and full-motion video signs. Examples of these products are EZBRIGHT, XTHIN and ULTRATHIN high-brightness LEDs; GENERATION II MEGABRIGHT LEDs for indoor lighting and other white-light applications; and RAZERTHIN mid-brightness LEDs.

Cree produces XLAMP high-performance and lighting-class LED components available in white and various colors. These components

### TABLE IV-3

**ADVANCED FLUORESCENT LAMP DEMAND BY TYPE & MARKET**  
(million dollars)

<table>
<thead>
<tr>
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<tr>
<td>Households (mil)</td>
<td>107.1</td>
<td>113.3</td>
<td>117.5</td>
<td>124.3</td>
<td>131.0</td>
</tr>
<tr>
<td>$ fluorescent/household</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Advanced Fluorescent Lamp Demand</td>
<td>490</td>
<td>905</td>
<td>2155</td>
<td>2330</td>
<td>1845</td>
</tr>
<tr>
<td>By Type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFLs</td>
<td>210</td>
<td>450</td>
<td>1375</td>
<td>1600</td>
<td>1135</td>
</tr>
<tr>
<td>Energy-Efficient</td>
<td>125</td>
<td>285</td>
<td>595</td>
<td>510</td>
<td>475</td>
</tr>
<tr>
<td>High-Output</td>
<td>155</td>
<td>170</td>
<td>185</td>
<td>220</td>
<td>235</td>
</tr>
<tr>
<td>By Market:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonresidential</td>
<td>395</td>
<td>625</td>
<td>705</td>
<td>795</td>
<td>830</td>
</tr>
<tr>
<td>Residential</td>
<td>80</td>
<td>270</td>
<td>1440</td>
<td>1520</td>
<td>1000</td>
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<tr>
<td>Other</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

“Demand for CFLs is forecast to increase 3.1 percent per annum through 2015 to $1.6 billion. Consumers switching over to CFLs as replacements for traditional incandescent lamps as a result of the EISA’s ban on incandescents will drive growth. CFLs are forecast to increase their share of the overall residential lighting market (which includes both advanced and traditional lighting) by a considerable percentage; however, …”

--Section IV, pg. 88
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