“Typical concrete has a higher reflectance value than asphalt, along with a smoother, more reflective texture. The higher reflectance values from concrete play as much of a role in the visibility and apparent brightness of the site as the lighting.”

US Department of Energy
www1.eere.energy.gov/femp/technologies/solid_state_lighting.html
Illuminance, Luminance and Concrete Pavement

In simplest terms, illuminance is the amount of actual light that strikes a surface. The density of the illuminance is measured in foot-candles (lumens per square foot, abbreviated fc), and is directly related to the proximity of the light source to the surface. Luminance is the light that is reflected by a surface, or transmitted through it, in the direction of the observer. Measured in candelas per square foot (cd/ft²), luminance is directly related to illuminance, factoring in the reflectivity of the surface. Due to its lighter color and uniform surface texture, the high reflectivity of a concrete pavement provides greater luminance than other typical pavements. In fact, studies show that a concrete pavement's average luminance is 1.77 times higher than asphalt.

Concrete uses lower watt bulbs*

Benchmark = 22 light poles / 400 W bulbs / 3.4 cd/m²
Asphalt = 400 W bulbs
Concrete = 250 W bulbs
Average savings of 6,027 kW-hr annually
Average 37.5% reduction in energy requirements

The LED effect
LED at 125 WATTS provides equivalent luminance of 400 W

Concrete uses 36% fewer light poles*

Target illuminance = 3.4 cd/m²
Asphalt requires 22 luminaires
Concrete requires 14 luminaires
Average savings 5,844 kW-hr annually
Average 36.4% reduction in energy requirements
Reduction in construction costs

With sustainability as the driving force behind development, there have been several recent legislative actions that require reductions in energy consumption to be incorporated in new design and construction. The Energy Independence and Security Act of 2007 (EISA 2007) mandates specific measures related to energy reduction that apply to all federal agencies. Among the requirements for federal facilities are:

- 25% greater efficiency for light bulbs, to be phased in from 2012 to 2014
- 200% greater efficiency for light bulbs, or similar energy savings, by 2020
- All new and renovated federal buildings must implement 55% reduction in fossil fuel use by 2010 and 80% reduction by 2020
- All new federal buildings must be carbon neutral by 2030

By combining the leading-edge technology in energy efficient lighting with concrete’s superior reflectivity, owners and developers can easily achieve these goals.

www.ConcreteParking.org

*Influence of Pavement Reflectance on Lighting for Parking Lots (Portland Cement Association, Skokie, IL, 2005)