A small numbers of car and even motorbikes now have full-LED headlamps. Dirk Vanderhaeghen of Philips Lumileds predicts that penetration will increase in the next few years.

He told LED Magazine editor Tim Whitaker that 2013 will see the first headlights requiring only a single LED module per headlight for a low-beam solution. This will reduce both cost and system complexity, and will open the way for penetration of LED headlights in mainstream vehicles, rather than just high-end ones.

Vanderhaeghen forecasts that the number of cars with LED headlights will grow from 1.5 million in 2013 to 5 million in 2015, and the value of the LED components used in this application will grow from $130m to $300m. The market value will not continue to grow as rapidly as the number of vehicles adopting LED headlights, since the number of LEDs per headlight unit will fall.

Beside their power-consumption and longevity advantages, Vanderhaeghen says LEDs “can also be used to express a strong brand identity.” There are design advantages of using LED systems that typically have a depth of about 5 cm, compared with 10-15 cm for halogen projectors. And then there is the smart functionality aspect of using an LED matrix to implement intelligent lighting that can illuminate around corners, for example.

The target for LED lighting is to be able to match the performance of HID lamps and provide about 1000 lm on the road, which for LEDs translates to about 2000 “hot source lumens” (i.e. an LED-module output of 2000 lm with a case temperature of 85°C). But there is also the need to move towards cost-effective, single-LED sources to enable mass adoption. “Most systems today use fans for cooling,” said Vanderhaeghen. “But this is not sustainable for OEMs to translate into mass-market vehicles.” He pointed out that LEDs rated at a maximum case temperature of 130°C, rather than 110°C, would allow the use of much smaller heatsinks for the same output.