

# **OPTION 1G**

## **LIMITING THE USE OF DAYTIME RUNNING LIGHTS AND OPTIONAL LAMPS**

### **Summary**

This analysis examines petroleum reduction that might be achieved by limiting the use of daytime running lights (DRLs), fog lamps, and other optional lights.

The analysis estimates that the petroleum savings from limiting the use of DRLs would not exceed 1 percent and would defeat the more important societal safety function they provide. Daytime visibility and avoidance of head-on or sideswipe multiple car accidents is the primary function of DRLs. Additionally, a general trend towards low energy/high luminosity lamps is occurring in the automobile market. Lower energy use in these lamps may be hastened by regulatory proceedings underway to correct for unintended glare. A proposed safety regulation will limit the luminosity of DRLs used in the United States in the near future.

### **Daytime Running Lights (DRL)**

Eight vehicle manufacturers selling cars in the United States include DRLs as a standard feature on new vehicles. One offers DRLs as an option and General Motors Corporation (GM) offers retrofit kits that can be installed not only on GM but other vehicle brands as well.<sup>1</sup> The DRL system typically activates headlamps at reduced intensity (and therefore reduced energy use) during daylight hours to keep a driver's vehicle highly visible to other vehicles (and pedestrians) and reduce multiple car daytime collision risk.

The National Highway Traffic Safety Administration (NHTSA) reports that extra fuel consumed with the use of DRLs is "a fraction of a mile per gallon," while the Insurance Institute for Highway Safety cites a range of \$3 to more than \$40 per year in extra fuel cost (a consolidation of costs reported by GM and Transport Canada).<sup>2</sup> The Institute for Road Safety Research of Netherlands (SWOV) reports 0.9 percent additional fuel use for DRLs based on European programs that have been in effect for several years.<sup>3</sup> A Swedish study completed in 2002 estimated a fuel economy penalty range of 0.5 to 1.5 percent for various approaches among member nations of the European Union in implementing DRL programs.<sup>4</sup> A recent study in Switzerland under "real world" Swiss driving conditions in European design gasoline passenger cars indicated about 0.8 percent fuel use when adjusting reported results to DRL use conditions.<sup>5</sup>

## **The Safety Benefits vs. Energy Use of DRLs**

The crash avoidance and life saving effectiveness of DRLs is documented in multiple assessments of mandatory, voluntary, and proposed programs in both Europe and North America. These studies clearly show driver and passenger lives saved by decreasing the number of multiple car and “angled” (left hand turns) accidents during daylight hours.<sup>6</sup> While mandatory in Canada, DRLs are not mandatory in the United States. General Motors Corporation petitioned the NHTSA in 2001 to initiate a rulemaking requiring all U.S. automakers to install DRLs on new vehicles.<sup>7</sup>

“Energy savings” versus “lives saved” trade-off studies on DRLs can not be found in current literature. The most obvious strategy for fuel savings, to not use DRLs, would defeat the more important public policy safety objective that has been achieved and reported. The second most obvious strategy is that of increasing the efficiency of DRL lamps. This is now taking place, with the development and introduction of higher efficiency (more lumens per watt) lamps employing xenon high intensity discharge (HID) and emerging LED technologies.<sup>8</sup> In addition, complaints of glare from DRLs during daylight hours has led to a NHTSA rulemaking process that would limit luminosity of DRLs to about half of that currently in use.<sup>9</sup> If the rule becomes final, NHTSA’s action will hasten an indirect energy savings effect by requiring higher efficiency DRLs.

## **Automotive Lighting Energy Use**

Actions could also be directed at discouraging inefficient or excessive use of existing fog or other “add-on” lamps, which generally consume more energy than DRLs. However, data is lacking regarding the number, power range, and frequency of installation and use of extra lamps.<sup>10</sup> Additional study beyond the rather narrow review presented here would be required.

The NHTSA has also opened a rulemaking addressing the problem of glare from extra headlamps and auxiliary lamps used at nighttime, a separate and more comprehensive look at all vehicle lamps not including DRLs. NHTSA has received numerous complaints from U.S. drivers concerning HID lamps which have a characteristic blue/white light that is both annoying and disabling.<sup>11</sup> This rulemaking is also examining glare from high mounted lamps on sport utility vehicles, pickup trucks, and vans, light that is reflected into passenger compartments from side and rear view mirrors on passenger cars and other classes of vehicles. The outcome of this proceeding could lead to additional restrictions on lamp luminance and thus future automotive lighting energy use trends. No final rule has been proposed by NHTSA as of April 2005.

## **Conclusion**

The energy use associated with DRLs is low, and on the order of one percent of fuel use (or less). Market trends show a downward trend in energy consumption in new technology lamps for headlamp applications including DRLs. With safety and crash avoidance as the reason for DRL use, any actions that would discourage their use would be inappropriate. NHTSA actions are likely to further decrease energy use once a new rule regulating luminosity from DRLs is finalized.

## **Further Study and Analysis Recommendation**

Further analysis is needed to determine California consumer behavior and frequency of excessive use of automotive lights of all kinds, excepting DRLs. Such a study should focus on Californians' purchase habits regarding optional lighting the frequency of purchase and use of extra lights installed "after market" by consumers or businesses, and the particular atmospheric conditions (fog, haze, dust, poor light, etc.) and behavior leading to either purposeful or inadvertent excessive use of these lights.

## Endnotes

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<sup>1</sup> DRLs are standard on all 1999 GM, Volvo, Lexus, Volkswagen, Mercedes Benz, Saab, Subaru, and Suzuki models as well as some Toyota models. Insurance Institute for Highway Safety-  
[www.hwysafety.org/safety.org/safety\\_facts/qanda/drl.htm](http://www.hwysafety.org/safety.org/safety_facts/qanda/drl.htm)

<sup>2</sup> [http://www.hwysafety.org/safety\\_facts/qanda/drl.htm#5](http://www.hwysafety.org/safety_facts/qanda/drl.htm#5)

<sup>3</sup> [www.swov.nl/en/swovschrift/09/the\\_safety\\_effects\\_of\\_daytime\\_running\\_lights.htm](http://www.swov.nl/en/swovschrift/09/the_safety_effects_of_daytime_running_lights.htm)

<sup>4</sup> “Daytime Running Lights” (2002), Deliverable 3: Final Report, contract NO. ETU/B27020B-E3-2002-DRL-S07.18830, TNO Human Factors, TNO, Delft, Netherlands

<sup>5</sup> Patrik Soltic and Martin Weilenmann, (2002), “Influence of Electric Load on the Exhaust Gas Emissions of Passenger Cars”, Eleventh International Symposium. Transport and Air Pollution, Graz, Austria, June 19-21, 2002. Staff divided a reported 1.6 percent increase in fuel consumption by two to account for typical DRL lamps in use in the U.S. (80 watts for two lamps).

<sup>6</sup> see power point presentation of Longhorne, et.al. “An Assessment of the Crash Reduction Effects of Passenger Vehicle Daytime Running Lamps”, National Center for Statistics and Analysis, DOT-NHTSA, June 11, 2003.

<sup>7</sup> General Motors Corporation press release, “New General Motors Study Shows Daytime Running Lamps Continue to Reduce Crashes”, October 28, 2003. GM reports that they have sold more than 30 million vehicles with DRLs in Canada and the United States.

<sup>8</sup> Traditional tungsten incandescent and halogen filament lamps are being replaced by lower energy use xenon High Intensity Discharge (HID) lamps and more recently Light Emitting Diode (LED) lamps. The European automotive lighting company Hella will install LED based lamps in their headlight pod to serve the DRL function for the Audi A8 W12 in 2004-2005. The power consumption is report as 8 watts per unit or 16 watts for the vehicle. This in comparison to low beam headlamp energy use of 160 watts or more (staff estimate). Source: Hella HG Hueck & Co.of Germany, Annual Report 2003-2004. [www.hella.com](http://www.hella.com)

<sup>9</sup> See NHTSA Docket 1998-4124 and 63 Federal Register (FR) 42348. [www.dms.dot.gov](http://www.dms.dot.gov)

<sup>10</sup> A search of the literature found a study of fog lamp frequency of installation and use in two southeast Michigan communities. Available at <http://dmses.dot.gov/docimages/p62/133159.pdf>

<sup>11</sup> See NHTSA Docket 1998-4820 [www.dms.dot.gov](http://www.dms.dot.gov)