



## System Performance Innovation FACT Sheet

### *Lighting Management Systems*

## Description of the Challenge or Opportunity

### Lighting Management Systems

#### Understanding the motivation.

The current on-going conversion of highway lighting to LED type lamps allows highway system owner-operators to reduce environmental impacts and cuts down on the annual maintenance and operating (energy) costs. With the advent of Advanced Lighting Management Systems (ALMS), these savings can be further enhanced through the utilization of existing Caltrans owned ITS infrastructure, and currently available technologies. ALMS allows owner-operators to adjust (i.e. lower) lighting levels based on traffic and ambient lighting conditions, which further reduces energy consumption and maintenance by extending the life of lamps. In addition, these systems allow central reporting of energy consumption and individual lamp status of operation which increases the efficiency of maintenance activities (including a reduction in field work thus reducing the potential for work-related injuries and fatalities).

## Information Regarding the Innovation

#### Defining the need.

The Caltrans Mission statement calls to “Provide a safe, sustainable, integrated and efficient transportation system to enhance California’s economy and livability”. The ALMS strongly supports those specific statements in that it significantly upgrades the safety of the roadway by ensuring that proper lighting conditions are present at all times. Maintenance staff can continually monitor the lighting systems on IP addressable equipment (Desktop, Laptop, iPad and iPhone like devices). The ALMS system is also sustainable in that the equipment used require little maintenance once installed. The devices responsible for reporting lamp status operate on wireless frequencies that can alert Maintenance of their operation at any instance in time. The ALMS will be integrated into the existing field installed Caltrans Fiber Optic Communication Infrastructure which ties in the lighting elements into the Transportation Management Center where the computer servers are housed allowing for Maintenance staff to remotely monitor the system via their IP Addressable devices. And last but not least, efficiency is the key aspect of ALMS in that electrical power savings and reduction of Maintenance staff time and exposure are the ultimate goals of this system. The deployment of the integrated ALMS will enable Caltrans to optimize the operation of the lighting system and improve safety on the freeways by allowing the lights to be monitored and controlled from a central location.



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#### **Estimating the cost.**

The capital costs to implement a 300 unit system (300 existing LED lamps) demonstration project amounted to just under \$100,000.00. There is Caltrans staff time involvement in that IP Addresses need to be set for every single lamp, as well as integration efforts involved to connect the system through the Caltrans Fiber Optic Communication Network.

#### **Quantifying the benefits.**

The benefits are significant pending the looming lighting guidelines to be established by the Department for electrical savings. Difficult to calculate based on the current Maintenance efforts to monitor lighting systems.

#### **Understanding the risks.**

Barriers to implementation of the innovation are purely institutional in that newer technologies are considered “risky” without individuals willing to experiment with them. Risks associated with implementation are minimal from a technological sense, though could be large in that staffing of the Electrical Divisions at Caltrans have been minimal. This area of the organization needs to be addressed if advanced and “integrated” technologies are to be implemented.