2020 ITS Project/Program Award (Municipal/Provincial/Federal)

The EcoDrive II project is the winner of the 2020 ITS Project/Program Award. In 2019, the City of Ottawa conducted a pilot project, named EcoDrive II, to investigate the potential environmental and fuel efficiency benefits of giving City fleet drivers advanced signal information across its entire 1,200 traffic signal system. Using a concept known as Green Light Optimal Speed Advisory (GLOSA), a group of City fleet drivers were equipped with a mobile app designed to provide a collection of real-time information about the current signal status (e.g., red vs. green), the time remaining for that phase, as well as an advisory travel speed they should maintain to reach the signal on a green cycle, if possible. The mobile app was also designed to record the real-time vehicle/engine status, hard braking/acceleration and fuel consumption information using the On-Board Diagnostic (OBD) unit.

The pilot project was based on previous work done in the United States through FHWA's GlidePath and AERIS programs which demonstrated savings of up to 18% in computer modelling and in a closed test environment with a single vehicle and signal. With the City of Ottawa fleet consuming millions of litres of fuel each year, the potential environmental and fiscal benefits of equipping drivers with this information were considered significant.

Using a cellular-based system for communicating with the vehicle, as opposed to localized DSRC communications, the City of Ottawa pilot project also provided a unique environment to test the benefits of providing drivers with GLOSA information due to the use of an actuated signal system. As these City fleet vehicles travelled the network conducting their normal business duties, GLOSA and OBD information were continuously logged for analysis.

Seven drivers were monitored and collected data over a two month period to measure whether their driving habits were altered by the provision of the GLOSA information and if there was a measurable savings in fuel consumption from the different driving habit between having and not having GLOSA data presented to them. The drivers ranged in age, level of comfort with technology and areas of the City in which they worked. Their typical work day was from 7AM to 3:30PM, thus covering the AM peak, lunch hour and both the morning and early afternoon shoulder periods.

Testing was performed during May and June 2019. Almost 24,000 kilometres of travel were logged and 29,000 signals passed through by the test drivers over the eight week period, with 4,660 litres of fuel consumed. A high-level evaluation was conducted by the City of Ottawa and a detailed analysis at the intersection level conducted Carleton University.

An average savings across the fleet of 5 percent during the two-month test period, with the most engaged driver achieving a 14 percent savings. Four key influences on the results were the acceptance of the technology by the driver, traffic conditions, road classification and time of day.

The project team involved several key organizations and departments. The City of Ottawa Traffic Services Branch provided real-time communications capability from their Traffic Control Centre to each of the City's 1178 traffic signals, all equipment and the test drivers. The SPaT data is made available through application programming interfaces (APIs) managed by the City's traffic signal consultant Thompson Technologies. Traffic Technologies Services is a leading information-as-a-service (IaaS) provider of traffic signal timing prediction information which served GLOSA data to the Android app and have worked with a leading auto manufacturer to make this data available in newer model year vehicles while driving around Ottawa. Carleton University

conducted the independent detailed data analysis in order to evaluate the benefits of using GLOSA in daily operations and generate the final data analysis report. Finally, Transport Canada provided funding and guidance to assist in the completion of this project through the Advance Connectivity and Automation in the Transportation System (ACATS) program.