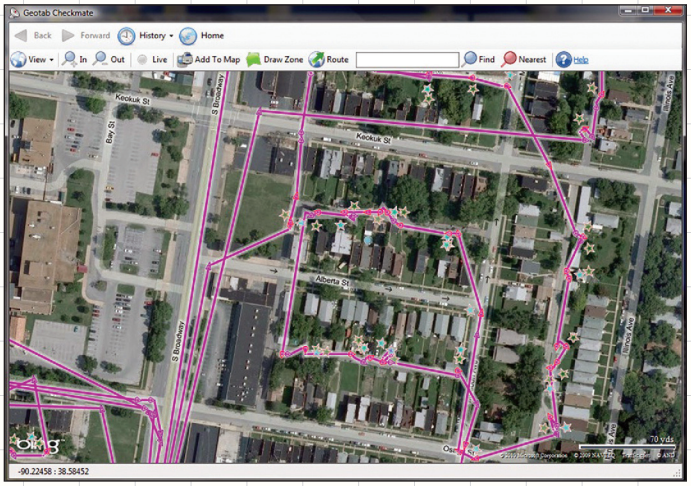
CASE STUDY

Location: St. Louis, MO
Company: City of St. Louis
Study: Fuel Economy

The City of St. Louis has long been interested in saving money though the use of alternative fuels and fuel economy planning. But it wasn't until 2007 when Chris Amos, commissioner of equipment services for the City of St. Louis found a cost-effective way to save money and began installing passive telematics devices into the company's fleet vehicles. The fuel savings of these devices has been remarkable, with each device paying for itself within the first 18 months of its usage. The estimated fuel savings over the life of the vehicles is typically around $7,000-8,000 over the cost of the equipment. While the equipment itself does not improve fuel economy, it allows for an understanding of vehicle operation so that fuel economy practices such as rerouting can be implemented.

Telematics are a combination of computer and communications equipment that provide data on the location of each vehicle and the status of the onboard systems. This allows department heads to monitor compliance with safety and fuel efficiency guidelines and establish efficient vehicle routes. The identification of more efficient routes and the reduction in vehicle idling and improved driver safety results in a significant decrease in fuel use and results in significant savings on fuel and maintenance costs.



Telematics let complete vehicle routes be recorded and monitored so that management decisions can be used to improve fuel economy. Photo courtesy of Chris Amos.

Decision Points

Starting in the mid-1990s, the City of St. Louis began looking for options to save on the price of fuel. Driven by the belief that the 1990 Clean Air Act would mandate fuel reduction and the use of alternative fuels, Amos began looking for the most cost-effective options. The challenge in seeking such an option was determining the ability of an alternative fuel vehicle to pay for itself over its lifetime when compared to a conventional vehicle. This was especially difficult given that the City's vehicles operate as short-range vehicles; alternative fuels tend to reach a pay-off point when increased fuel efficiency is increased by increased highway driving efficiency. "If we could find an alternative fuel that would just break even and pay for itself, we would use that option," Amos said.

St. Louis experimented with numerous types of alternative fuels. Biodiesel was attempted and rejected because of the increase in costs, as well as the lack of tax subsidies. Ethanol (E85) ran into similar concerns. Compressed Natural Gas (CNG) "performed well and came close to breaking even during the high gas prices of the late 2000s, but gas prices started dropping again and the gap was too large," Amos reported. Fuel savings were realized when hybrid vehicles were utilized, but the high cost of the vehicles negated the savings and the vehicles did not project to pay off over their lifetime.

Telematics first showed up on Amos' radar in 1998, but it wasn't cost effective at that time. The telematics systems at that time were all active systems, meaning that there was a constant cellular signal being sent from the vehicle to the data collection point. This system provided up-to-the minute information, but also included the cost of the cellular service to transmit the signal, something that would not be financially feasible for the purposes of the St. Louis fleet, which was more interested in tracking fuel efficiency than in knowing where each vehicle was at every moment.

It wasn't until 2007 that Amos was able to identify a company providing a passive telematics system, one which does not require a constant cellular signal, but rather collects data on an onboard device which is then downloaded once the vehicle is returned to its home garage. This process made the technology more cost-efficient than active systems. St. Louis tested the technology in four vehicles in 2007.

The 2007 test demonstrated significant fuel and maintenance cost savings, and the City began exploring wide-scale implementation of the technology in their vehicles. Installation of the units began in 2008 and 2009 in several departments and has remained ongoing as each department head must sign off on the device's installation within their fleet.

Fleet Facts

The City of St. Louis operates 2,440 vehicles, a number that includes 800 vehicles that are currently off-road. The city's fleet is overseen by the Equipment Services Division, which is responsible for maintenance and vehicle replacement for fleet vehicles. ESD operates four garages and 15 fueling sites. The ESD is responsible for the purchase and maintenance of the city's vehicles, but fuel cost and day-to-day operation of the vehicles is under the control of the managers of the departments where the fleet vehicles are assigned.

QUICK FACTS

Alternative Fuel Practice: Fuel Economy (Telematics)

Number of Fleet Vehicles: 2,440

Vehicle Instrumented with Telematics: 313

Estimated Vehicle Life: 10 years

Estimated Lifetime Savings per Vehicle: $7,000-8,000

Infrastructure

Telematic devices record how each vehicle and its systems are used. They can measure the amount of time a vehicle spends idling, the distance traveled, the amount of time a vehicle is at rest, and vehicle speed. These devices include a GPS system to track where the vehicle has gone and how much fuel it expends by traveling those routes, allowing for the identification of more fuel efficient routes to common destinations.

City of St. Louis Fleet Vehicle Types:

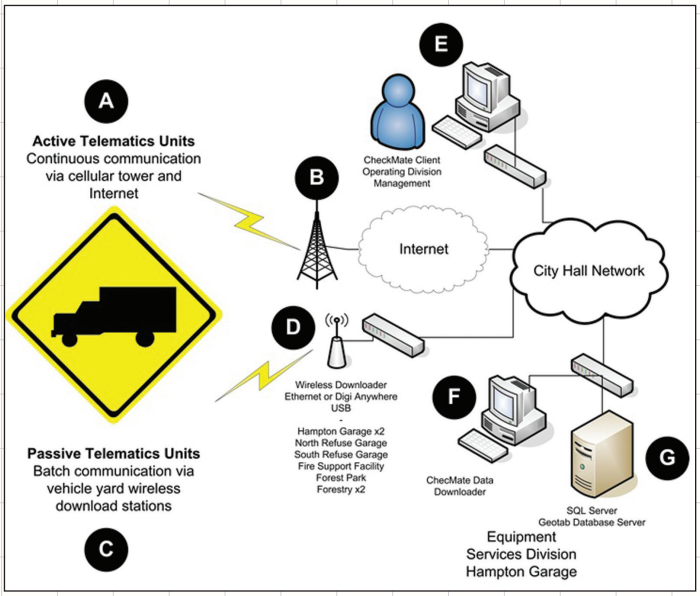
- Tow Trucks
- Refuse Trucks
- Street Sweepers
- Dump Trucks
- Flusher/Brine Distribution Trucks
- Roll-off Container Trucks
- Service Trucks
- Cargo Vans
- Aerial Trucks
- Tree-trimming Trucks

When the systems first came into use, there were only two ways to acquire the data; through a cellular signal sent by each individual device, or by downloading the information manually from each vehicle. Both options presented problems to the cost-conscious fleet manager. Cellular service for each vehicle has the potential to be prohibitively expensive, especially in cases where the fleet manager does not need real-time location data. Manual downloading could have a similar problem; as fleets grow larger, it takes more time and man-hours to manually download the information.

The system St. Louis uses is a cost-efficient middle ground. With the exception of the City's tow service, none of the telematics devices installed have an active cellular signal. Nor does the system require that each system be downloaded manually. Rather, each vehicle's data is downloaded via a short-range Wi-Fi connection located at vehicle yards, fuel islands, or maintenance shops. Downloading the data does not require a large commitment of man-hours, nor does it require a special trip.

Costs

As of September 2011, 313 telematics units had been installed in St. Louis fleet vehicles. An additional 15 units have been purchased for installation. As of the same date, Amos had identified another 116 good and 56 possible candidates for installation. As of September, the total cost for the telematics systems was approximately $358,000. This cost includes the passive telematics system employed by most of the fleet, and the active systems used by the City towing fleet, which uses the active system so vehicles can be efficiently dispatched using real-time location data.



Schematic of the telematics network. Photo courtesy of Chris Amos.

The average cost of each unit is $700 for both passive or active units and $57 per hour for installation of the devices. Data download stations cost $1,845 per unit in addition to electrical and network connection costs. The active devices cost an additional $36 per month per vehicle. The cost includes $2,000 per year for server software support.

Amos reports that each unit provides, in conjunction with fuel economy and worker safety policies, a 7-8% savings in fuel consumption. Maintenance costs are also reduced significantly due to the concurrent reduction in vehicle idling, decreasing the wear-and-tear on an engine. Amos stated that the telematics units pay for themselves in fuel and cost savings within the first 18 months of their installation. He estimates that, when considering the typical 10-year lifetime of a vehicle, that each unit ultimately saves $7,000-8,000 over the lifetime of the vehicle. With a fleet as large as that of the City of St. Louis, the total savings could be in the hundreds of thousands of dollars.

St. Louis has even installed telematics on its hybrid tree trimming truck. Photo courtesy of Chris Amos.

Maintenance and Satisfaction

Of the St. Louis departments that have installed telematics devices, there has been universal satisfaction with the technology among the department managers. Every department that has implemented the technology has seen a significant decrease in fuel costs. There have been some technical glitches, including a recent firmware update that required that each installed device be rewired. Overall, Amos expresses a great deal of personal satisfaction with the technology overall. The results have been a decrease in fuel and maintenance costs, and increase in driver safety and efficiency, and the development of more fuel and time efficient routes for common destinations.

Summary

The City of St. Louis developed a fuel economy plan that strived to achieve increased fuel efficiency and a decrease in fuel and maintenance cost. This plan was supplemented and enforced with the installation of passive telematics technology. The technology provided St. Louis with the means and ability to enforce the fuel economy plan. The result of these actions created cost savings that project to far exceed the initial cost of installing the devices. The results have included:

- Route changes for refuse pick-up, street sweepers, and snow plows
- Vehicle use monitored
- 7-8% decrease in fuel consumption
- Vehicle unit payback within 18 months

From the early 1990s, Amos sought ways to decrease conventional fuel usage. St. Louis tried numerous alternative fuels, hybrid vehicles, and the implementation of a fuel economy plan. Starting in 2007, passive telematic technology provided the solution.