

EXECUTIVE SUMMARY

Many rural areas lack an integrated communications or power infrastructure that can support the deployment of intelligent transportation systems (ITS). As a part of the California Oregon Advanced Transportation Systems (COATS) Showcase project, the Western Transportation Institute at Montana State University conducted a study to document case studies of innovative solutions for addressing the communications and power needs of ITS field devices deployed in a rural environment. This project report provides the most recent information on current technologies and strategies utilized by transportation agencies throughout the country to supply communications and power to ITS field devices at remote sites.

A Project Evaluation Team was assembled to assist in the study. The team, composed of representatives from the California and Oregon Departments of Transportation (Caltrans and ODOT, respectively) and the Federal Highway Administration (FHWA), provided valuable advice and recommendations in conducting the project.

This report consists of three chapters. The first chapter reviews literature regarding applicable communications and power alternatives that have been evaluated or deployed in rural areas. There are more options available to mitigate the communications problem than power source alternatives. Solar power is being considered as a primary energy source to empower devices at both urban and rural areas. Other sources of energy such as wind generators and propane fuel cells are, however, being explored to complement or replace solar power, especially by states that suffer through long winters and harsh environment.

Chapter 2 provides a summary of an online survey conducted among all 50 States' Departments of Transportation (DOT's). The survey consisted of three basic questions regarding each state's experiences in the deployment of video and non-video (high and low bandwidths) applications and alternative power sources in rural areas. Twenty-six responses were received from 23 state agencies for a 44 percent response rate. Responses were entered into a database to allow queries to be conducted on each individual question.

Upon reviewing the survey report, the Project Evaluation Team suggested that the reported video (high bandwidth) and non-video (low bandwidth) communications applications are generally standard approaches. Thus, no communication applications were selected for further investigation. With the power source alternatives, however, the team recommended gathering additional information from the participating state DOT's that had indicated using or experimenting with the wind powered and thermal electric generators and propane fuel cells.

Chapter 3 reports on the follow-up inquiries that were sent to the agencies with selected power source alternatives. Having few moving parts, wind generators were reported as very reliable power sources. Not much information was provided on propane fuel cells. ODOT indicated using thermal electric generators, which use a propane fuel source and a thermopile to generate electricity. The generator has no moving parts and therefore is fairly low maintenance. Alaska DOT is currently experimenting with Solid Oxide Fuel Cells (SOFC) to provide power to remote weather stations. The cells were reported to be highly efficient and durable.

Coordinated efforts on national and/or state levels appear to enhance the coverage and technology of the wireless communications means. The State of California, for example, through the Department of General Services has a contract that provides telecommunications services for all state agencies. The contract includes voice and data services, ability to purchase telecommunications equipment, technical support, and a planned consolidated billing system. Similar efforts might be found helpful in improving the current shortfalls of communications needs in rural areas.

The lack of power sources in rural areas is also an issue when deploying ITS in rural locations. Wind generators and propane fuel cells are two alternative power sources that some states are currently using or experimenting with to complement or replace the solar energy. Wind generators are known for their efficiencies and low maintainability. Although, propane fuel cells are still at their experimental stage, they are being considered as another promising source of energy for rural areas.