

**Introduction**

In our province, aging infrastructure and severe flooding over the past two decades have us replacing or undertaking substantial repairs to our bridge network. These replacements or repairs typically require a two lane highway to operate as one lane for both directions necessitating some form of traffic control.

Traditionally, trailer mounted Portable Traffic Signal Systems (PTSS) powered by 12 volt DC batteries recharged by solar panels are used in these applications. The trailers are easily deployed and can be set up on short notice.

The PTSS can operate for indefinite periods of time where the climate is conducive to an adequate solar power source. Yet, providing solar energy cannot always be relied on as the climate is not always conducive to it. This has a major disadvantage when working in winter months where the cold temperatures make it challenging for solar panels to provide charging for the batteries. This is especially true for remote areas where there are no available power grid connections.


**Objectives**

1. Which can be powered by a reliable stable power source.
2. That will utilize the same controller as the solar powered 12 volt DC system to reduce spare part inventory.
3. Where the control signals at the project start and finish points can be 500 to 1000 meters apart.
4. Which does not require cabling between the control signals at either end of the project.
5. Which will keep operating during snowy, cloudy, cold weather conditions.
6. That is easily installed and in a short time frame.
7. Where one pole can be utilized to support two traffic signal fixtures, a hydro lighting.
8. Where the signals at each end of the project are monitored for conflicting indications as well as lamp outs for safety reasons.

**Design a System:**

1. The design allows the use of the same controller for either solar powered systems (PTSS) or 120 volt AC powered systems, thus reducing the need of redundant stocking, in case of failure. The controller may be programmed to operate in a fixed time mode or in a fully actuated mode using any one of multiple vehicle sensor types.
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**Working in conjunction with manufacturers, Manitoba Infrastructure and Transportation’s Traffic Engineering Branch, was able to have a system developed which meets all objectives. Manitoba’s unique solution involves the use of a wireless communication 12 volt DC system which has its battery bank held at a constant level of charge through the use of 120 volt AC smart charging equipment, thereby eliminating the deep discharge, recharge cycles of the solar powered systems, as well as providing several hours of battery backup operation when the grid power goes down.**

**Conclusions**

The ease of installation reduces the labour costs and the wireless communication system eliminates cabling expenses and voltage drop issues associated with long runs of cable. Removing the cable runs also allows construction projects to proceed unpinned by the cables. It removes the issue of having to design methods to establish hard wiring from Signal A to Signal B. All communication between signals including monitoring is accomplished wirelessly through antennas. The mounting height of each antenna is adjustable to allow line of sight to other signal. The system includes a remote monitoring system which allows the user to receive email or text messages to provide notification of system failures or low battery warning. Communication with the units can be via cellular phone service where available or satellite phone service in remote areas.

**Acknowledgements**

The author would like to thank Robert J Burns from Galaxy Signals, Mike Winters from John Thomas Incorporated and Darren Collins from MlT Traffic Engineering.