



# Research Notes

RSN 11-04

April 2011

## Solar Powered Navigational Lighting System Demonstration Project

ODOT will be installing a solar powered navigational lighting system on the Astoria-Megler Bridge as part of a pilot project approved by the Federal Highways Administration (FHWA). The coastal bridge is the connection across the Columbia River on U.S. Highway 101 between Oregon and Washington. The 4.1 miles long Astoria-Megler Bridge, originally built in 1966, still contains the original navigational lighting system.

Navigation lights on coastal bridges are required by the United States Coast Guard. The lights must be operational at all times, day and night, year round without exception.

The existing electrical conduit for the navigational lighting system has deteriorated and is in need of replacement. The cost of replacing the existing electrical conduit alone was estimated at between \$400,000 and \$500,000. The solar electric system is a viable alternative that is economical, practical, and sustainable with an in-house estimated cost of approximately \$300,000.

Working with the ODOT Bridge Preservation Engineering Team, the Research Section assisted with research and development of the design and bid documents for installing a solar powered navigational lighting system. The FHWA approved \$355,000 for the pilot project funded through an Innovative Bridge Research and Development Grant.

The project includes the installation of new navigation lights (aviation, center channel, dolphin and obstruction lighting), solar panels, back up batteries, panel supports, mounts, connections and access walkways on the bridge piers and superstructure.

The existing lighting system will remain in place as a backup for a minimum of one year while the solar powered lighting system is tested. Using one data logger per each type of navigation light, monitoring of the new system will include four main categories:

- Light intensity, which looks at efficiencies of the solar panels,
- DC voltage output, to track how batteries and solar panels perform at different temperatures,
- Charging current, which monitors how much electrical output the solar panels are sending to the batteries, and
- Temperature, to measure outside ambient temperature.

Construction is expected to take place in the summer of 2011. This project is timely as the existing navigation lights need to be replaced on the bridge due to corrosion. If the pilot project is successful, ODOT plans to consider using durable solar powered lighting systems on other coastal and remote area bridges.



*Locations of the five different types of solar lights on the Astoria-Megler Bridge*



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