Evaluation of Hybrid Electric Street Sweepers
Finding a better alternative to using compressed natural gas or diesel-powered sweepers.

WHAT IS THE NEED?

The South Coast Air Quality Management District (SCAQMD) regulations prevent California Department of Transportation (Caltrans) from acquiring new diesel street sweepers for use in SCAQMD jurisdiction. As a result, Caltrans began using compressed natural gas (CNG) sweepers. The CNG units are not as reliable as diesel sweepers and have lower production rates. The Divisions of Equipment (DOE) and Maintenance want to determine if there are better alternatives to using CNG powered sweepers.

WHAT ARE WE DOING?

This research entails a review and evaluation of street sweepers in several combinations of drivetrain and fuel type. Each sweeper drivetrain configuration will be subjected to the identical test cycle to allow direct comparison of fuel use, efficiency, and emissions. The research team will perform chassis dynamometer and Portable Emissions Measurement System (PEMS) tests for all five street sweepers.

WHAT IS OUR GOAL?

The goal of this research is to determine if hybrid electric street sweepers powered by gasoline, diesel, or fuel cells are a better alternative to using CNG or diesel-powered sweepers. To make this determination, the researchers will compare diesel, CNG, diesel hybrid, gasoline hybrid, and hybrid fuel cell sweepers.
WHAT IS THE BENEFIT?

This research will identify the best equipment and methods to meet sweeping needs while minimizing costs and satisfying all regulatory mandates and laws.

WHAT IS THE PROGRESS TO DATE?

The research team at the University of California, Riverside (UCR) is working on schematics for the mounting rack that will be fabricated for the Portable Emissions Measurement System (PEMS) testing. The team has visited the Bloomington Caltrans yard and is in discussions with the head mechanic there about the PEMS installation.

The UCR team is receiving activity data to the servers from several sweepers and is able to download activity data from US Hybrid for the hydrogen sweeper. The team is analyzing the data to try to identify operating modes and associated characteristics.

The team is working on the sweeper operator and maintenance surveys, which will be presented to Caltrans staff for review.