

EPA's Village Green Project: New Directions

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Abstract

The US EPA's Village Green Project (VGP) is an example of using innovative technology to enable community-level, real-time air pollution measurements using low-cost sensor technologies. The VGP is an air monitoring system configured as a park bench located outside of a public library in Durham, NC. It contains air monitoring and meteorological instruments that measure PM_{2.5} (Thermo pDR-1500), ozone (2B Technologies), temperature, relative humidity, wind speed, and direction. The entire station utilizes solar energy with battery backup to be self-powered and totally off the grid. In the first ten months of field sampling since June 2013, the station has successfully collected over 5300 hours of PM_{2.5} and ozone concentration data. To evaluate the VGP sensor system performance, data collected were compared with nearby federal equivalent methods (FEM) for PM_{2.5} and ozone, resulting in close comparability (e.g., $r^2 = 0.74$ for hourly-averaged PM_{2.5}, $r^2 = 0.76$ for hourly ozone). Future directions involve replicating the prototype and deploying to areas of interest, such as environmental justice communities. This new effort in 2014-2015, referred to as Village Green Project II (VGPII), is supported through EPA's E-enterprise initiative. This project will advance the technology by: 1) installing several new VGP systems in the United States with state and community partnerships; 2) developing IT scalability to easily add new stations, share/exchange data between partners, and utilize AirNow to host multiple real-time data streams; 3) increasing system capability to perform in northern locations (cold weather, lower solar conditions); and 4) exploring additional pollutants to be measured (e.g., NO₂). VGPII will be a catalyst for partnerships between EPA and the states to enhance advanced monitoring opportunities and address their local needs.