Near Real-time Solar Irradiance and Aerosol Optical Depth from NOAA ISIS and SURFRAD Stations for Verification of Solar Forecasts for the Solar Forecast Improvement Project (SFIP)

K.O. Lantz[1,2], J.A. Augustine[2], G. Hodges[1,2], D. Longenecker[1,2], E. Hall[1,2], J. Wendell[2], C. Long[1,2], A. McComiskey[2] and M. Marquis[2]

[1]Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, CO 80309; 303-497-7280, E-mail: Kathy.O.Lantz@noaa.gov
[2]NOAA Earth System Research Laboratory, Global Monitoring Division, Boulder, CO 80305

NOAA is partnering with the U.S. Department of Energy (DOE) and two DOE funded teams, the National Center for Atmospheric Research (NCAR) and International Business Machines (IBM) on a Solar Forecasting Improvement Project (SFIP). The main goal of SFIP is to improve solar forecasting and thereby increase penetration of renewable energy on the electric grid. NOAA's Integrated Surface Irradiance Study (ISIS) and Surface Radiation (SURFRAD) network is part of this initiative by providing high quality solar irradiance measurements for verification of improvements in solar forecasting for the short-term, day ahead, and ramp events. In this presentation, I will give an overview of the NOAA SFIP project. There are 14 ISIS and SURFRAD stations across the continental United States. The NOAA SURFRAD team has three main components: 1) In addition to the existing stations, two mobile SURFRAD stations have been built and deployed for 1 year each at two separate solar utility plants. 2) NOAA SURFRAD/ISIS communications have been updated at their sites to provide near real-time data for verification activities at the 14 sites. 3) Global horizontal irradiance (GHI), direct normal solar irradiance (DNI), and aerosol optical depth at various spatial and temporal averaging will be compared to forecasts from the 3-km High-Resolution Rapid Refresh (HRRR) and an advanced version of the 13-km Rapid Refresh (RAP) models, and to NOAA NESDIS's real-time satellite estimates of solar irradiance from GOES at the full spatial and temporal resolution.

Figure 1. Total Sky Imager at an Xcel Energy Utility Plant, Colorado

Figure 2. Mobile SURFRAD installation in Rutland, VT with Green Mountain Power