We present a new climate data record for total solar irradiance and solar spectral irradiance between 1610 and present-day with associated wavelength and time dependent uncertainties, and quarterly updates. The data record, which is part of the National Oceanographic and Atmospheric Administration’s (NOAA) Climate Data Record (CDR) Program, provides a robust, sustainable, and scientifically defensible record of solar irradiance that is of sufficient length, consistency, and continuity for use in studies of climate variability and climate change on multiple time scales, and for broad user groups spanning climate modeling, remote sensing, natural resource and renewable energy industries. The data record, jointly developed by the University of Colorado Boulder’s Laboratory for Atmospheric and Space Physics (LASP) and the Naval Research Laboratory (NRL), is constructed from a two-component solar irradiance model that determines the changes from quiet Sun conditions when facular brightening and sunspot darkening features are present on the solar disk, where the magnitude of the delta changes in irradiance are determined from linear regression of proxy indices- the Mg II index and sunspot area, respectively- against the approximately decade-long solar irradiance measurements of the SOlar Radiation and Climate Experiment (SORCE). To promote long-term data usage and sharing for a broad range of user groups, the source code, the dataset itself, and supporting documentation are archived at NOAA’s National Climatic Data Center (NCDC). The dataset is also available through LASP’s Interactive Solar Irradiance Data Center (LISIRD) for user-specified time periods and spectral ranges of interest.