The Impact of Improved Temporal Profiles for Point Sources on Air Quality

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Electric Generating Units (EGUs) are one of the highest contributors of air pollutants, especially for NO_X and SO_2. Under certain conditions their impact on air quality, both ozone and $PM_{2.5}$, might be significant. Identification and quantification of uncertainty in emissions estimates for these sources are essential in improving air quality model results in regulatory modeling efforts. In this study, our aim is to quantify uncertainty in EGU emissions due to temporalization. For this we have developed unit specific temporal profiles, using Continuous Emissions Monitoring (CEM) data, as well as facility specific and state specific temporal profiles for Northeastern United States (i.e. Mid-Atlantic/ Northeast Visibility Union (MANE-VU) region). We compared these profiles with default temporal profiles used in SMOKE. Furthermore, we prepared hourly CEM data to be used in SMOKE. For this purpose we utilized CrossWalk data between NEI and CEM that are provided by the MANE-VU States.

This paper summarizes the findings of these comparisons at emission distribution level. We investigate the impact of utilizing unit/facility specific temporal profiles as well as hourly CEM data on air quality by running CMAQ with both the default and the improved temporal profiles cases respectively. In this study we also investigated temporal profiles for Peaking Units (i.e., Units used under heavy electricity demand) based upon the data from EPA's Clean Air Markets Division. Using default temporal profile for these units can cause a significant underestimation of emissions during hot days when electricity consumption peaks. This paper will present the impact of using unit specific profiles for Peaking Units on air quality as well.