

Emissions Data Files Provided with the July, 2015 Ozone Transport Modeling Data NODA

The EPA has released a NODA that includes emission inventories for 2011 and 2017 along with supporting data and methods. The docket that contains the information is #EPA-HQ-OAR-2015-0500. The emission inventories and associated data and documentation are also available electronically from the 2011v6.2 section of EPA's Emissions Modeling Clearinghouse (EMCH) at <http://www.epa.gov/ttn/chief/emch/index.html#2011>. Data files needed to run the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system version 3.6.5 (<https://www.cmascenter.org/smoke/>) to prepare emissions input data for air quality modeling of the years of 2011 and 2017 are included. These files include emission inventories, data to spatially allocate the emissions to model grid cells, data to temporally allocate the emissions to hours, and data to speciate the inventory pollutants into the chemical species used by the air quality model, along with summaries of the data. Documentation of the emissions modeling platform used in support of this analysis can be found in the Technical Support Document "Preparation of Emissions Inventories for the Version 6.2, 2011 Emissions Modeling Platform", also known as the Emissions Modeling TSD for the 2011v6.2 platform.

Some data files are too large to place directly on the Emissions Modeling Clearinghouse or in the electronic docket. To obtain the following types of data, please send an email requesting the data to eyth.alison@epa.gov and possiel.norm@epa.gov:

- Emission Factors output from MOVES
- Sector-specific emissions output from SMOKE
- Air quality model-ready emissions data files
- Non-emissions inputs for air quality models

Details about provided data are given below. For more information on the emissions files provided with the data release, please contact Alison Eyth at eyth.alison@epa.gov, or (919) 541-2478.

Organization of 2011v6.2 Platform Files on the Emissions Modeling Clearinghouse

The emissions modeling-related files for the 2011v6.2 platform posted the Emissions Modeling Clearinghouse are organized into several directories:

- 2011emissions contains emissions inventories and other SMOKE input files specific to 2011, along with subdirectories that contain state-specific extractions of inventories along with input databases used to create 2011 onroad emissions data (see below for more details);
- 2017emissions contains emissions inventories and other SMOKE input files specific to 2017, along with subdirectories that contain state-specific extractions of inventories along with input databases used to create 2017 onroad emissions data (see below for more details);
- ancillary_data contains non-emissions input data files for SMOKE, like temporal factors, speciation factors, and cross references;

- reports contains summaries for both 2011 and 2017, including some that include the v1platform values for 2011 and 2018 that were released in the 2013 NODA for the 2011 Emissions Modeling Platform and the 2014 NODA for the 2018 Emissions Modeling Platform;
- smoke scripts utils contains scripts for running SMOKE and other related utility programs for both 2011 and 2017; and
- spatial surrogates contains data for spatially allocating county-based emission to grid cells and associated documentation.

The emissions modeling-related files for the 2011v6.0 platform were posted previously under the FTP folder: <ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/>.

Emissions Modeling Sectors

To aid in the review of the emissions data, they have been summarized and reorganized into a series of reports with the goal of making the data easier to understand. The summaries and reports can be found in the reports subdirectory of the data release described above. Some of the summaries have data in terms of emissions modeling sectors, which represent emissions for specific categories of sources. The modeling sectors are defined as follows:

- afdust/afdust_adj - area fugitive dust emissions; afdust_adj are the emissions after meteorological and land use adjustments
- ag - agricultural ammonia emissions
- agfire - emissions from agricultural fires
- beis - emissions from natural sources
- c1c2rail - C1 and C2 commercial marine vessel emissions plus locomotive emissions
- c3marine - C3 marine (ocean going vessel) emissions
- nonpt - nonpoint (county-level) not included in other sectors
- nonroad - mobile source emissions from off-road equipment
- onroad - mobile source emissions from vehicles on roads
- othafdust - Non-US area fugitive dust emissions
- othar - Non-US area source emissions
- othon - Non-US onroad source emissions
- onhpt - Non-US point source emissions, including off shore oil platforms
- ptprescfire - Point source prescribed fire emissions
- ptwildfire - Point source wildfire emissions
- ptegu - Emissions from EGUs not specifically designated as peaking
- ptnonipm - Point source emissions not included in ptegu or pt_oilgas
- pt_oilgas - oil and gas emissions from point sources
- np_oilgas - oil and gas emissions from nonpoint sources
- rwc - residential wood combustion emissions

Note: for some reports, some sectors are combined to allow easier comparison with the v1 platform. These situations are described in the README tab for the report.

Modeling Case Abbreviations

The EPA uses unique abbreviations for each modeling case. The updated 2011 case for which data are provided is known as 2011eh_cb6v2_v6_11g and many of the files provided reference this abbreviation or the first portion of it. The parts of the abbreviation can be interpreted as follows: 2011 is the year being modeled, “e” stands for evaluation case meaning it uses year-specific data for EGUs and fires, “h” means it is the fourth instance of the modeling platform, cb6v2 means it used version 2 of the CB6 air quality model speciation, “v6” corresponds to the 2011 modeling platform, and “11g” denotes that the meteorological data are for 2011, while g corresponds to the meteorological model version and configuration. Future model runs of 2011 or 2017 will have different abbreviations. The 2017 case that is comparable to this 2011 case is 2017eh_cb6v2_v6_11g. Thus, the 2011v6.2 platform includes the cases 2011eh_cb6v2_v6_11g and 2017eh_cb6v2_v6_11g. The 2011v6.0 preliminary modeling platform included the cases 2011ed_cb6v2_v6_11g and 2018ed_cb6v2_v6_11g.

Items for which EPA requested Comment

The EPA has requested comments on various aspects of the emissions modeling platform. These aspects are described below, along with suggestions regarding which files to use to support the review of the specific aspects of the emissions platform.

Emissions Modeling Methods: EPA used the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system version 3.6.5 to prepare data for air quality modeling for the 2018ed_v6_11f case. More information about SMOKE including descriptions of input data formats is available from <http://cmascenter.org/smoke/>. The specific methods and settings for SMOKE are embodied in the scripts used to run each sector. The scripts to run smoke for the cases can be found in the directory ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/smoke_scripts_utils/. Emissions modeling methods are also documented in the 2011v6.2 Emissions Modeling TSD.

2011 and 2017 Emission Values: The EPA requests comment on the criteria air pollutant (CAP) 2011 emissions and projected 2017 emissions in the modeling inventories, with a focus on ozone precursors such as NO_x and VOC. The EPA will accept comments on other CAPs and on hazardous air pollutants (HAPs), as they are included in the inventories, but these are not the focus of this effort. National inventory files can be found in the following compressed zip files:

- Point source emissions: 2011eh_v6_11g_inputs_point.zip, 2017eh_v6_11g_inputs_point.zip, with state-specific zips in the directory point_by_state;
- Continuous Emissions Monitoring System data: 2011eh_v6_11g_inputs_cem.zip, 2017eh_v6_11g_inputs_cem.zip;

- Nonpoint source emissions: 2011eh_v6_11g_inputs_nonpoint.zip, 2017eh_v6_11g_inputs_nonpoint.zip with state-specific zips in nonpoint by state;
- Nonroad source emissions: (Note: for 2011, only Delaware has changed since the v1platform) 2011eh_v6_11g_inputs_nonroad_part1.zip; 2011eh_v6_11g_inputs_nonroad_part2.zip, 2017eh_v6_11g_inputs_nonroad.zip
- Onroad activity data: 2011eh_v6_11g_inputs_onroad.zip, 2017eh_v6_11g_inputs_onroad.zip;
- Onroad mobile source emissions: the onroad subdirectories contain national files of CAPs and speciated PM, along with state-specific zip files; and
- Non-US emissions: (including inventories for Canada, Mexico, and offshore sources) 2011eh_v6_11g_inputs_oth.zip, 2017eh_v6_11g_inputs_oth.zip.

In the Flat File 2010 (FF10) format files, the annual emissions values are located in the ANN_VALUE column. Some emission inventories (e.g., nonroad) may also have values filled in to the monthly value columns (e.g., JAN_VALUE, FEB_VALUE, ..., DEC_VALUE). Note that all of the emission values in the flat files are in units of tons. The EPA requests comment on both the annual and monthly emissions values, where applicable. The Flat File 2010 (FF10) formats are defined for nonpoint (including nonroad) and point sources at these locations:

<https://www.cmascenter.org/smoke/documentation/3.6.5/html/ch08s02s08.html#d0e40196>
<https://www.cmascenter.org/smoke/documentation/3.6.5/html/ch08s02s04.html#d0e37959>

Summaries of emissions by state and county are provided to aid in the review of emissions values. State total emissions for each modeling sector, including speciated emissions, can be found in the summary reports 2011eh_cb6v2_v6_11g_state_sector_totals.xlsx and 2017eh_cb6v2_v6_11g_state_sector_totals.xlsx.

County total annual and monthly emissions for all modeling sectors can be found the summary reports 2011eh_county_monthly_report.xlsx and 2017eh_county_monthly_report.xlsx. A county by sector level comparison of the 2011v6.0 platform released in the 2013 and 2014 Emissions Modeling Platform NODAs with the 2011v6.2 platform cases are provided in 2011ed_2018ed_2011eh_2017eh_county_annual_totals.xlsx.

State, sector, and SCC level emission summaries and onroad mobile source activity data that include SCC descriptions are also available in the reports directory: 2011eh_state_fullSCC_summary.xlsx, 2011v6.0_v6.2_onroademis_activity_state_SCC_summary.xlsx, and 2011v6.0_v6.2_point_nonpoint_nonroad_state_SCC_summary.xlsx.

State and sector-specific daily NO_x and VOC emissions are available in 2011eh_2017eh_state_sector_daily_nox_voc.xlsx and total NO_x and VOC emissions are available in 2011eh_2017eh_state_sector_daily_nox_voc.xlsx. A complete list of the provided summaries is at the end of this document.

Emission Values for EGUs: The EPA requests comment on the IPM version 5.14 input assumptions, the associated NEEDS database, 2018 unit-level parsed files, flat file inputs, the 2017 flat file, and cross references for matching between IPM and the NEI. The following files related to this part of the request for comment are provided at

<http://www.epa.gov/powersectormodeling/psmodel514.html>:

- [needs_v514.xlsx](#): National Electric Energy Data System (NEEDS) database input to IPM version 5.14 that contains the generation unit records used to construct the "model" plants that represent existing and planned/committed units in EPA modeling applications of IPM, along with basic geographic, operating, air emissions, and other data on these generating units;
- [EPA Base Case v514 Incremental Documentation.pdf](#): Incremental documentation for NEEDS v5.14;
- [Web-Ready Parsed File EPA5-13 Base Case 2018.xlsx](#): A file showing the IPM results approximated down to the generating unit level;
- [Adjusted2017.pdf](#): Documentation of what was adjusted in the 2018 result to create 2017 emissions;
- [FlatFile Inputs.xlsx](#): A spreadsheet of lookup table data used by IPM v5.14 to convert the state level power estimates to the detailed flat file information needed by SMOKE;
- [FlatFile Methodology.pdf](#): Documentation of how the SMOKE flat file is created by IPM v5.14; and
- [Flatfile 2017 20150319 23mar2015 v2.csv](#): The emission inventory flat file based on output by IPM v5.14 that can be input to SMOKE for air quality modeling.

These additional files are provided in the docket for this notice:

- [ipm_to_flat_file_xref_2011NEIv2_IPM5.14_20150113.xlsx](#): The version of the IPM to NEI flat file cross reference that was used with IPM v5.14.
- [ipm_to_flat_file_xref_2011NEIv2_Updated_20150710.xlsx](#): An updated version of the IPM to flat file cross reference that will be used for scenarios that will be created with IPM in the future. This version should be used as the starting point for comments.

Inputs and activity data used to develop mobile source emission inventories: The EPA requests comment on the mobile source model input data used to develop the projected future mobile source emission inventories. These include both the databases used to create emission factors and the vehicle miles traveled and vehicle population activity data used to compute the emissions. Of particular interest are county total vehicle miles traveled, the mixture of vehicle types in 2017, and changes to the inspection and maintenance programs. The national onroad activity datasets can be found in the files [2011eh_v6_11g_inputs_onroad.zip](#) and [2017eh_v6_11g_inputs_onroad.zip](#). Alternative activity data should be provided in SMOKE FF10 activity data format, but can be uploaded to the docket in .csv or .xlsx format. MOVES input databases for representative counties are available

in the onroad subdirectory or [2011emissions](#) and [2017emissions](#), respectively. Alternative MOVES input data other than activity data should be provided as MOVES databases for each affected county. Contact Alison Eyth at eyth.alison@epa.gov for instructions if you would like to submit MOVES databases. Additional information on data and methods used for mobile sources is available the 2011 NEI version 2 TSD and in the Emissions Modeling TSD.

Projection data and methods. The EPA seeks comment on the data used to project point and nonpoint source emissions from 2011 to 2017, and on the methods and assumptions used to implement the projections. In this context, nonpoint source emissions are inclusive of commercial marine vessel, railroad, and other nonpoint emissions. In particular, EPA seeks comment on its assumptions regarding the manner in which specific consent decrees and state- or locality-specific control programs will be implemented. Projection methods are described in the Emissions Modeling TSD. Summaries are provided in the report [2017eh CoST Summaries state.xlsx](#). The detailed data used to project emissions of various sectors with the Control Strategy Tool can be found in the file [2017eh CoST Projection packets.zip](#).

Existing 2011 Control Techniques: Control techniques for a unit independent of pollutants can be found in the point source inventory flat files in [2011eh_v6_11g_inputs_point.zip](#), [2017eh_v6_11g_inputs_point.zip](#), and in the state-specific extractions of these data. The point source flat files specify the control techniques specific to each pollutant in the CONTROL_IDS and CONTROL_MEASURES columns with levels of reduction in the ANN_PCT_RED column.

Temporal allocation: The annual emissions in the modeling inventories are allocated into hourly values for air quality modeling. Except for electric generating units, factors for the temporal allocation of emissions to hours are the same in 2011 as in 2017. Day-specific EGU totals for units without CEMS are available in the 2011 SMOKE input file [ptipm_ff10_noncem_2011eg_Nov19_2014_29jan2015_v2](#), and for 2017 in the SMOKE input file [ptipm_ff10_noncem_2017eh_final_adj_29apr2015_v0](#). Emission totals by county, sector, and month can be found in the county-month-sector reports [2011eh_county_monthly_report.xlsx](#) and [2017eh_county_monthly_report.xlsx](#). Temporal profiles are available in [ancillary_data/ge_dat_for_2011v2_temporal.zip](#). Summaries of the main temporal profiles used by sector are available in the Emissions Modeling TSD. Alternative temporal profile and temporal cross reference data should be provided in a format compatible with SMOKE as specified in <https://www.cmascenter.org/smoke/documentation/3.6.5/html/ch08s03.html>.

The file [2017eh_v6_11g_inputs_cem.zip](#) contains hourly CEMS-style emissions for the ptegu sector. These data are based on the hourly temporal patterns derived from the 2011 hourly CEMS data available on EPA's Clean Air Markets Program Data website (ampd.epa.gov) that are adjusted to match the 2017 emissions projected by IPM 5.14. Seasonal (winter/summer) to hour temporal factors based on 2011 CEM sources were applied to the seasonal 2018 IPM source emissions for sources that could

be matched to ORIS Facility and Boiler IDs. The state-specific onroad inventories and the nonroad inventories discussed above include monthly emissions for those sectors.

Spatial Surrogates: County-level emissions in the modeling inventories are allocated onto air quality model grid cells with spatial surrogates. The same spatial surrogate data are used for both 2011 and 2017. The spatial surrogates and documentation for these can be found in the directory ftp://ftp.epa.gov/EmisInventory/2011v6/v2platform/spatial_surrogates/. The formats for the spatial surrogate files are in the SMOKE User's Manual on this page: <http://www.cmascenter.org/smoke/documentation/3.6.5/html/ch08s04s02.html>. Please provide any alternative spatial surrogates or cross-reference data in a format compatible with SMOKE.

Chemical Speciation: Prior to air quality modeling, the inventory pollutants such as NO_x, PM_{2.5}, and VOC need to be allocated into the chemical species used by the air quality model through the application of speciation profiles. The speciation profiles for the platform are consistent with version 4.4 of the SPECIATE database. Some updates to speciation data are made for the 2017 case as compared to 2011 for mobile sources. The EPA requests comment on the speciation profiles used in the 2011v6.2 modeling platform, as well as any information that could help improve the speciation of oil and gas emissions in both the eastern and western United States in 2017. Oil and gas speciation information, along with VOC to TOG adjustment factors that are used to compute methane emissions, would be of the most use at the county or oil/gas basin level of detail and also for each distinct process at oil and gas drilling/production facilities (e.g., glycol dehydrators).

Speciated emissions by state and sector are shown in the reports [2011eh_cb6v2_v6_11g_state_sector_totals.xlsx](#) and [2017eh_cb6v2_v6_11g_state_sector_totals.xlsx](#). Speciation profiles for CB6 can be found in [ge_dat_for_2011v2_speciation_cb6.zip](#) under [ancillary_data](#). Speciation profile summaries are included in the Emissions Modeling TSD. The formats for speciation data are provided in the SMOKE User's Manual on this page: <http://www.cmascenter.org/smoke/documentation/3.6.5/html/ch08s05.html>. Please provide any alternative speciation data in a format compatible with SMOKE.

Alphabetic list and contents of provided summary reports:

1. [2011v6.0_v6.2_onroad_emis_activity_state_SCC_summary.xlsx](#): Onroad emissions and activity data by comparison SCC for the 2011v6.0 and 2011v6.2 platforms
2. [2011v6.0_v6.2_point_nonpoint_nonroad_state_SCC_summary.xlsx](#): Point, nonpoint, and nonroad source emissions by state and SCC with descriptions for the 2011v6.0 and 2011v6.2 platforms
3. [2011ed_2018ed_2011eh_2017eh_county_annual_totals.xlsx](#): County total annual emissions by sector for the 2011v6.0 and 2011v6.2 platforms
4. [2011eh_2017eh_state_sector_daily_nox_voc.xlsx](#): Daily NO_x and VOC emissions by state and sector for the 2011v6.2 platform

5. [2011eh 2017eh state total daily nox voc.xlsx](#): Daily total NOx and VOC emissions for the 2011v6.2 platform
6. [2011eh cb6v2 v6 11g state sector totals.xlsx](#): Inventory and speciated emissions by state and sector for 2011eh CB6 case
7. [2011eh county monthly report.xlsx](#): Emissions by county, month, and sector for 2011eh case
8. [2011eh county SCC7 sector CAP PM.xlsx](#): CAP and speciated PM emissions by county, sector, and truncated SCC
9. [2011eh state fullSCC summary.xlsx](#): A state+SCC summary for CAPs for all sectors in the 2011eh case, including biogenics, agricultural fires, prescribed fires and wild fires. Also has ptnonipm separated from pt_oilgas.
10. [2017eh cb6v2 v6 11g state sector totals.xlsx](#): Inventory and speciated emissions by state and sector for 2017eh CB6 case
11. [2017eh CoST Summaries state.xlsx](#): Summaries of impacts of projection packets by state
12. [2017eh county monthly report.xlsx](#): Emissions by county, month, and sector for 2017eh case