Air pollution – created by human activities such as vehicle use, industrial operations, and agriculture practices, or by natural events such as wildfires – can influence air quality and public health. Every three years, U.S. Environmental Protection Agency (EPA) with the help of many organizations, including state, tribal, and local air pollution control agencies, industry, and researchers, compiles a comprehensive summary of air emissions data known as the National Emissions Inventory (NEI). The 2020 NEI and Trends Report highlights the most recent and comprehensive 2020 NEI as well as emissions trends through the year 2022. This report explains how air emissions are estimated and used and also provides a user-friendly interactive tool that allows users to explore emissions, emissions trends, and source contributions to air pollution. The 2020 NEI provides a look at how the COVID-19 pandemic influenced air emissions.

The emissions in this interactive report include the directly emitted criteria air pollutants and their precursors (CAPs), black and organic carbon (components of PM2.5), all 187 hazardous air pollutants (HAPs), and diesel PM. The CAP-related emissions are ammonia, carbon monoxide, lead, nitrogen oxides, particulate matter (PM10 and PM2.5), sulfur dioxides, and volatile organic compounds.

What is the NEI?

The National Emissions Inventory (NEI) is a national compilation of air emissions estimates. The Agency adds information from EPA emissions programs, such as the emission trading program, Toxics Release Inventory (TRI), and data collected during rule development or compliance testing. EPA uses the NEI to develop and review regulations, conduct air quality modeling, and conduct risk assessments to understand how air pollution may affect the health in communities across the country. An example of EPA's use of the NEI is that the data are used as one of the considerations in area designations for new or revised National Ambient Air Quality Standards (NAAQS). It is also key data for basis of AirToxScreen. Other federal agencies, along with state, local, and tribal air agencies, and members of the public and international organizations also use the data the inventory provides.

For more information about the NEI, check out EPA's Air Emissions Inventories webpage.

Source Types and Sectors

The NEI covers both natural and anthropogenic (human-caused) sources of emissions. The four major source types are:

1. stationary (point and nonpoint) sources,
2. mobile sources,
3. fires, and
4. biogenics (naturally occurring emissions from soils and vegetation sources).

Within each of the source types, emissions are provided at more detailed levels - sectors and sources classification codes (SCC) which provide more specificity about the source. There are 60 sectors in the NEI and thousands of active SCCs, where each sector includes a varying number of SCCs for similar processes. Each SCC has 4 levels which describe the process from a general to more specific activity with each successive level.

The NEI is also broken out into data categories, which relate to how the data are reported and stored in the Emissions Inventory System (EIS). Point sources are generally large facilities such as power plants or chemical manufacturers. Nonpoint and most mobile sources are reported at the county level. Nonpoint sources include many dispersed sources such as oil and gas production, agricultural livestock waste, residential heating, fires, and volatile chemical products (e.g., consumer solvent usage and coatings).

More information on these sources can be obtained from the Air Emissions Inventories webpage.
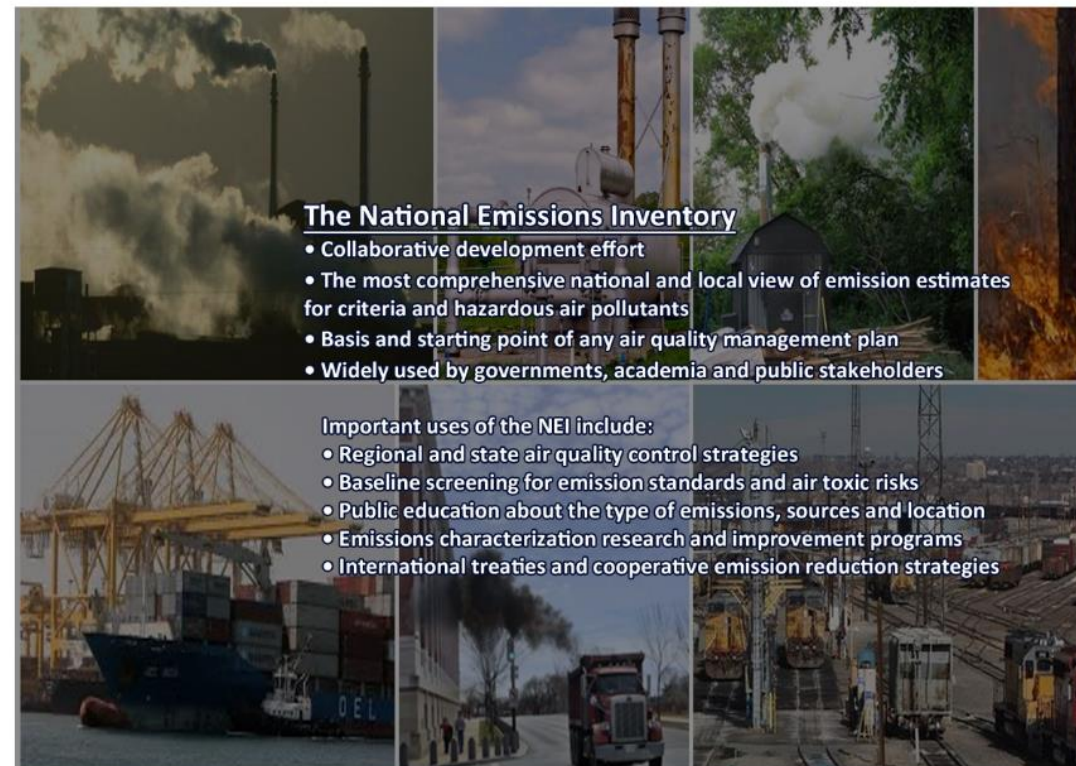
Emissions Estimates

Emissions data are derived in several different ways:

- continuous measurements,
- estimates using infrequent source samples, and
- estimates based on average emission rate information.

Our understanding of air emissions from specific sources continues to expand and the 2020 NEI includes improved emissions estimation methods for all data categories. These changes are discussed more in this report under the *2020 NEI Updates* tab. Nonpoint EPA tools used for estimating emissions include the Wagon Wheel Tool and Oil and Gas Production and Exploration Tool. Emissions estimates documentations for Fires, Commercial Marine Vehicles (CMV), Aircraft, and Locomotive/Railyards are available on the 2020 NEI Supporting Data and Summaries site, along with HAP augmentation and PM speciation information that are completed in the Emissions Inventory System (EIS).

More detailed information on emissions estimates can be found in the 2020 NEI Technical Support Document (TSD).

The National Emissions Inventory
- Collaborative development effort
- The most comprehensive national and local view of emission estimates for criteria and hazardous air pollutants
- Basis and starting point of any air quality management plan
- Widely used by governments, academia and public stakeholders

Important uses of the NEI include:
- Regional and state air quality control strategies
- Baseline screening for emission standards and air toxic risks
- Public education about the type of emissions, sources and location
- Emissions characterization research and improvement programs
- International treaties and cooperative emission reduction strategies

Sources of Data

Data in the NEI come from a variety of sources. The emissions are predominantly from State/Local/Tribal (S/L/T) agencies for both CAP and HAP emissions. In addition, EPA quality assures and augments the data provided by states to assist with data completeness, particularly with the HAP emissions since S/L/T HAP reporting is voluntary.

For more information on sources of data in the NEI, please review the 2020 NEI TSD.

Emissions Trends

The latest version of the 1970 - 2022 data show the trends for Tier 1 categories which distinguish pollutant emission contributions among major source types. Improvements to the methods used to estimate emissions for the years 2002-2019 are included in these data. These updated procedures minimize the effects of method changes on emissions over this time frame. Year 2020 trends data is represented by the 2020 NEI data, and trend data for years 2021 and 2022 are based on the 2020 NEI with year specific updates for point sources, fires, and mobile sources. Another addition to the trends products includes EIS sector specific national and state trends for the time frame 2002-2022, as well as the addition of black carbon and organic carbon as pollutants.

Emission decreases are largely driven by federal and state implementation of stationary and mobile source regulations. Read more about the Clean Air Act and progress since 1970 by visiting the Progress Cleaning the Air and Improving People's Health website Progress Cleaning the Air and Improving People's Health website.

The 2020 NEI

With any new inventory cycle, EPA makes changes to improve the process of creating the inventory and the methods for estimating emissions. For the 2020 NEI, the Agency made updates to pollutant, SCC, and North American Industrial Classification System (NAICS) codes, and refined quality assurance checks and features that were used to assist in quality assurance. In addition to process changes, we improved emissions estimation methods for all data categories. See the *2020 NEI Updates* section for more detailed information on these changes.

COVID-19

The impacts of the COVID-19 pandemic are reflected in the 2020 NEI. Human cremation and most types of vehicle travel were notable emission sources that were impacted, on a monthly and even annual emissions basis.

Human deaths increased 29% nationally between 2017 and 2020 due to the COVID-19 pandemic, resulting in an increase in emissions for all pollutants in the human cremation sector across all states. Pollutants emitted for human cremation include particulate matter, SO2, NOx, VOC, CO, and HAPs. Human cremation is also a source of mercury emissions, due to mercury in dental fillings, as well as naturally occurring mercury in the body.

Passenger car traffic went down, while in some areas freight shipping increased. Regions that typically showed slower speeds due to congestion experienced speeds that rose to free flow conditions during the day during certain months, especially in March, April, and May. As expected, the pandemic contributed to significant decreases in 2020 for all Highway Vehicle pollutants.
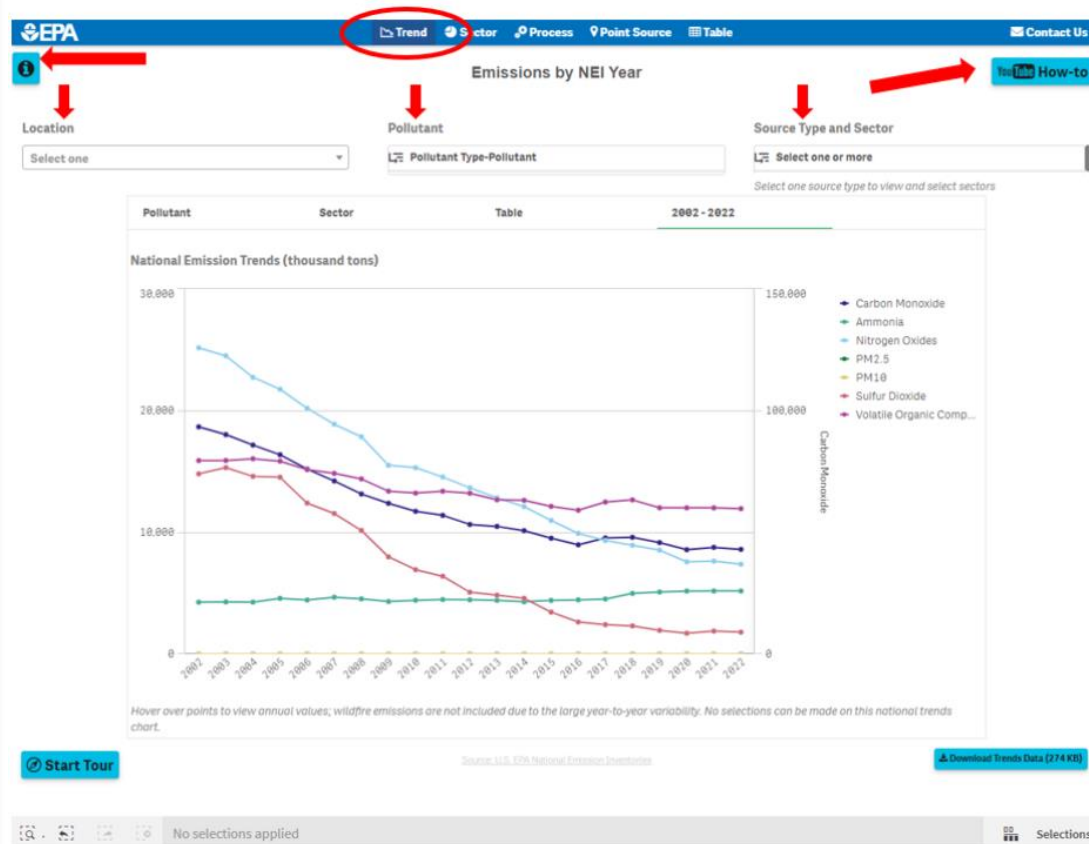
Tool How-To

The NEI Exploration Tool includes five tabs: Trend, Sector, Process, Point Source, and Table. Each tab features its own page of visual aids and filters that can be used to explore the 2020 NEI data in different ways. This section includes screenshots and descriptions of each tab, as well as helpful examples of questions the tool can help answer.

Trends

The 2002-2022 national trend line indicates a general decrease for the criteria air pollutant emissions. Directly emitted fine particle pollution (PM2.5) and ammonia (NH3) emissions have decreased little over the last decade. Both of these pollutants contribute to PM2.5 in the air.

The trends shown are for criteria air pollutants (CAPs) covered by the National Ambient Air Quality Standards (NAAQS), excluding lead. Lead emissions sharply declined after it was eliminated from gasoline and have remained low. Emission trends at the state level may not always follow the national average. The mix of source contributions and the rate of change varies by state.

Explore the **Trend** tab in the NEI Exploration Tool below to view emissions trends.

Trends data are available for download on the Air Emissions Trends Data site.

EPA   Trend   Sector   Process   Point Source   Table   ✉ Contact Us

You Tube How-to
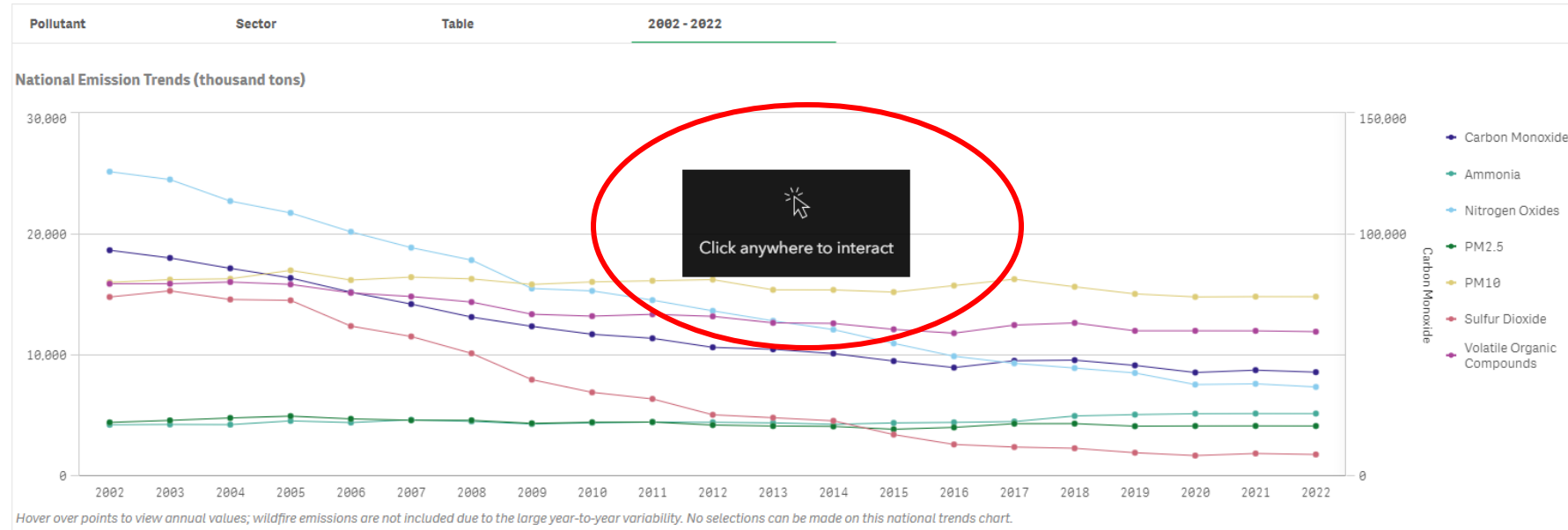
Emissions by NEI Year

Location

Select one ▼

Pollutant

POLLUTANT TYPE-POLLUTANT
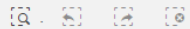
Source Type and Sector

SELECT ONE OR MORE

Select one source type to view and select sectors

Pollutant	Sector	Table	2002 - 2022

National Emission Trends (thousand tons)

Click anywhere to interact

- Carbon Monoxide
- Ammonia
- Nitrogen Oxides
- PM2.5
- PM10
- Sulfur Dioxide
- Volatile Organic Compounds

Hover over points to view annual values; wildfire emissions are not included due to the large year-to-year variability. No selections can be made on this national trends chart.

⊘ Start Tour

⬇ Download Trends Data (274 KB)

Source: U.S. EPA National Emission Inventories

No selections applied   Selections

EPA   📈 Trend   ⬤ Sector   ⚙ Process   📍 Point Source   ⊞ Table   ✉ Contact Us

ⓘ

North Carolina Emissions
Mobile Sources

YouTube How-to

Location
⊟ SELECT ONE OR MORE
Select one state to view and select counties

Pollutant
⊟ POLLUTANT TYPE-POLLUTANT

Process
⊟ SELECT ONE OR MORE
Select one or more SCC level to view

| Location | **Pollutant** | Process | Table |

North Carolina 2020 County Emissions

North Carolina 2020 Total Emissions (tons)
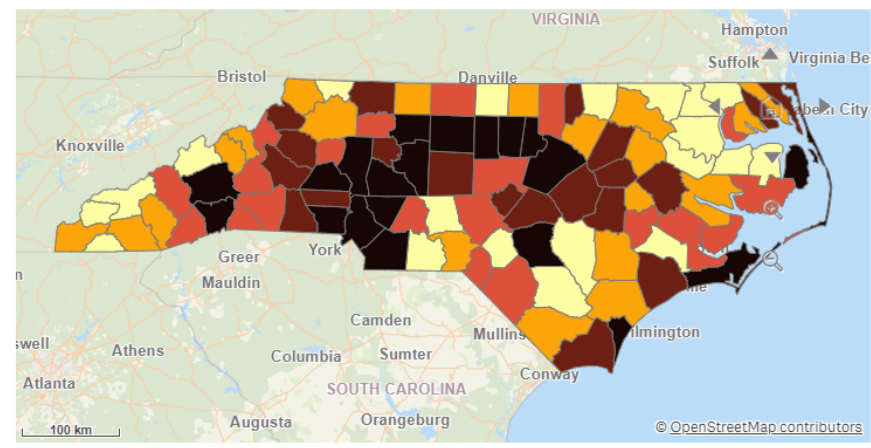
Please be patient while map reloads after making selections

⊕ County   ⊕ Tribal Land

🧭 Start Tour
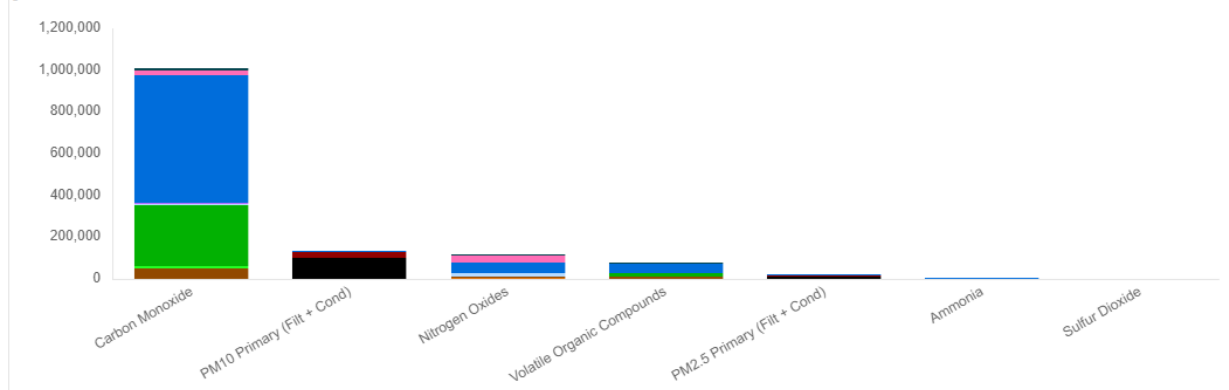
15 processes are shown at a time, use the dropdown to view and select others

Source: U.S. EPA National Emissions Inventory 2020

⬇ Download Process Data (108 MB)

| STATE_NAME North Carolina ⊗ | POLLUTANT_TYPE CAP ⊗ | SCC_LEVEL_1 Mobile Sources ⊗ | | Selections |

Improved Onroad Mobile Temporal Data for 2020

EPA acquired telematics data from StreetLight Data, Inc. to better represent the effects of the pandemic on onroad mobile source emissions. These data helped quantify distributions of vehicle speeds and fractions of vehicle miles traveled by hour, day of week, and month. **This is not an NEI methodology update that will be repeated each NEI,** but has helped better characterize onroad patterns during the pandemic.

02 / 11

2017 vs 2020 NEI
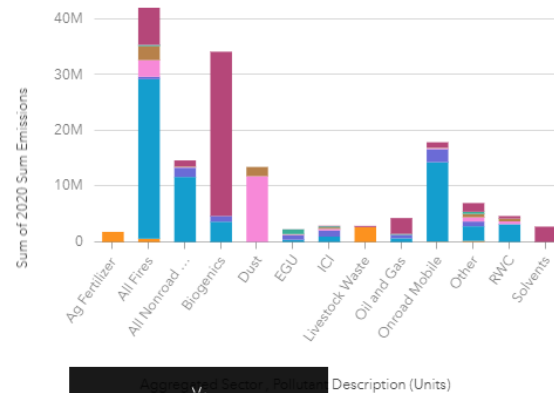
2017 National Pollutant Sums by Aggregated Sectors | 2020 National Pollutant Sums by Aggregated Sectors
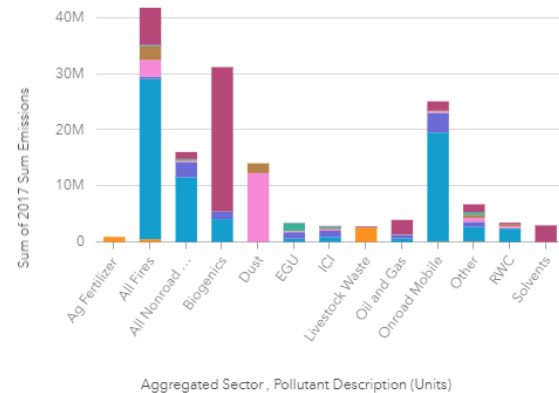
Aggregated Sector , Pollutant Description (Units)

Aggregated Sector , Pollutant Description (Units)

Click anywhere to interact

Pollutant Description (Units)

- 🟧 Ammonia (TON)
- 🟦 Carbon Monoxide (TON)
- 🟪 Nitrogen Oxides (TON)
- 🟪 PM10 Primary (Filt + Cond) (TON)
- 🟫 PM2.5 Primary (Filt + Cond) (TON)
- 🟩 Sulfur Dioxide (TON)
- 🟥 Volatile Organic Compounds (TON)

Choose one or more Data Category

🔍 Search for a value   ⇅▾

- ☑ Select All
- ☑ Nonpoint
- ☑ Nonroad

Choose Pollutant(s) (Units)

🔍 Search for a value   ⇅▾

- ☑ Select All
- ☑ Ammonia (TON)
- ☑ Carbon Monoxide (TON)

Choose Aggregated Sector(s)

🔍 Search for a value   ⇅▾

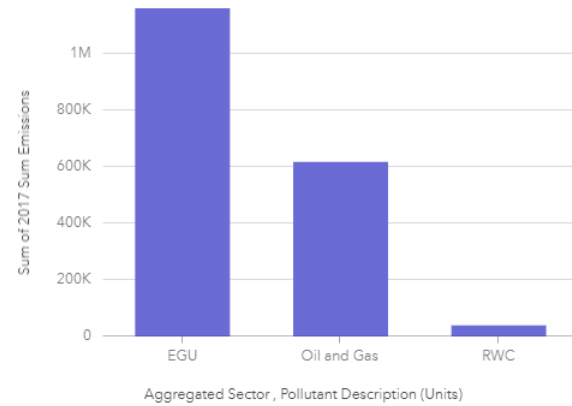- ☑ Select All
- ☑ Agricultural (Ag) Fertilizer
- ☑ All Fires

What changes in emissions did we see between the 2017 NEI and 2020 NEI?
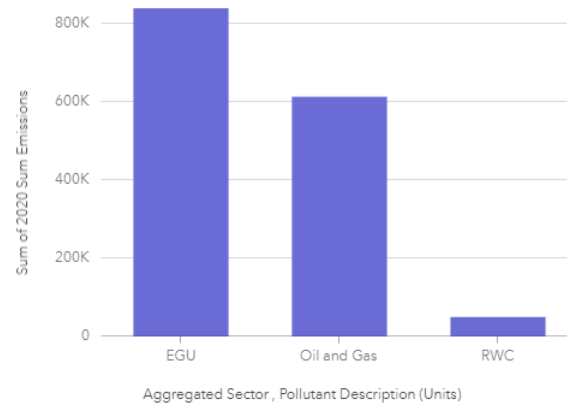
Nitrogen Oxides (NOX)

Excluding fires and biogenics, NOX saw an overall 21% decrease from 11.2 million (M) tons in 2017 to 8.8M tons in 2020. This decrease was seen across most major categories with the exception of Residential Wood Combustion (RWC), where 2020 emissions increased by 27% compared to 2017. Additionally,

2017 National Pollutant Sums by Aggregated Sectors   2020 National Pollutant Sums by Aggregated Sectors

Pollutant Description (Units)

■ Nitrogen Oxides (TON)

What changes in emissions did we see between the 2017 NEI and 2020 NEI?

Nitrogen Oxides (NOX)

Excluding fires and biogenics, NOX saw an overall 21% decrease from 11.2 million (M) tons in 2017 to 8.8M tons in 2020. This decrease was seen across most major categories with the exception of Residential Wood Combustion (RWC), where 2020 emissions increased by 27% compared to 2017. Additionally, onroad decreased by 33%, nonroad 22%, and Electric Generating Units (EGUs) 28%, while oil and gas maintain similar emissions to 2017 nationally. These sectors can be explored in the interactive graphics to the left.

Particulate Matter (PM) 2.5

National emissions of PM 2.5 in 2020 were similar to those seen the 2017 NEI. Some notable changes by

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Choose one or more Data Category

🔍 Search for a value   ↕⁝▾

☑ Select All
☑ Nonpoint
☑ Nonroad
☑ Onroad
☑ Point

Choose Pollutant(s) (Units)

🔍 Search for a value   ↕⁝▾

☐ Select All
☐ Ammonia (TON)
☐ Carbon Monoxide (TON)
☑ Nitrogen Oxides (TON)
☐ PM10 Primary (Filt + Cond) (TON)
☐ PM2.5 Primary (Filt + Cond) (TON)

Choose Aggregated Sector(s)

🔍 Search for a value   ↕⁝▾

☐ Select All
☐ Industrial, Commercial, Institutional (ICI)
☐ Livestock Waste
☐ Miscellaneous (Other)
☑ Oil and Gas
☐ Onroad Mobile
☑ Residential Wood Combustion (RWC)

Thank you!

We hope you have enjoyed learning about the NEI and its importance in determining emissions trends and source contributions to air pollution. Using the most recent and comprehensive NEI, the emission dashboards allow exploration of state and local areas, the pollutants emitted, and amount contributed by different sources. To learn more about the NEI, visit the EPA's Air Emissions Inventory website and check out the AirKnowledge training courses available through the Trainings webpage.

Contact Us

Questions? Email NEI_help@epa.gov