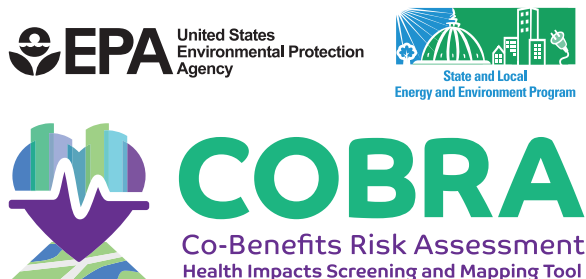


COBRA User Fact Sheet



Sources of Data for COBRA Inputs

The U.S. Environmental Protection Agency's (EPA) CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA) estimates and monetizes the health impacts resulting from changes in air pollution emissions. To conduct analyses in COBRA, a user must enter data on emissions of primary fine particulate matter (PM_{2.5}), sulfur dioxide (SO₂), nitrogen oxides (NO_x), ammonia (NH₃), and volatile organic compounds (VOCs). This document includes a sample list of sources for this data, organized according to common sectors analyzed using COBRA.

Data sources overview: This list identifies sample sources of data and tools that can be used to develop inputs to conduct analyses in COBRA. While some users may already have emissions data to analyze with COBRA, other users may find these data sources helpful in developing those emissions inputs.

This list is not meant to be comprehensive, but rather it is meant to help users get started in developing scenarios and calculating emissions changes to use with COBRA. Note that there may be other sources of data, such as datasets from state or local agencies, that could be more suited to your analysis. In addition, inclusion in this list does not necessarily constitute an endorsement by EPA.

The sources listed here includes both sources of historical data and tools that can be used to estimate or project emissions, such as EPA's AVOIDED Emissions and geneRation Tool (AVERT), which estimates the emissions impacts of renewable energy and energy efficiency. The list of historical data sources

includes information on both emissions (e.g., tons of PM_{2.5}) and activity data (e.g., fuel consumption estimates). Emissions data can be entered directly into COBRA. Activity data can be used to estimate emissions by applying emissions factors. The EPA reference document AP-42 Compilation of Air Emissions Factors and the 2017 National Emissions Inventory Technical Support Document are comprehensive sources of air emissions factors from multiple sectors and emissions sources for the U.S.^{1,2}

The illustrative example below shows how it is possible to use fuel consumption data to estimate the change in PM_{2.5} emissions from a hypothetical 10 percent decrease in industrial natural gas use in Pennsylvania in 2019.

Illustrative example of using activity data to derive emissions

estimates to enter into COBRA: According to the U.S. Energy Information Administration (EIA), Pennsylvania's industrial natural gas consumption was 249,026 million cubic feet (MMcf) in 2019. Therefore, a 10 percent reduction would be equal to a change of approximately 24,900 MMcf. To estimate the change in emissions, you can multiply the natural gas consumption value by a sector- and pollutant-specific emissions factor. For example, the emissions factor for industrial PM_{2.5} is 0.43 pounds of PM_{2.5} per MMcf of natural gas consumed.³ The calculation is as follows:

$$24,900 \text{ MMcf} \times 0.43 \text{ lbs. PM}_{2.5} \text{ per MMcf} \div 2000 \text{ lbs. per ton} = 5.35 \text{ tons PM}_{2.5}$$

You can then enter a reduction of 5.35 tons in COBRA to estimate the health impacts of those reductions.

All Sectors




U.S. EPA


 **National Emissions Inventory.** County-level data on emissions for all sectors included in COBRA, as well as facility-level emissions data for larger sources. <https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei>


Fuel Combustion: Electric Utilities



U.S. EPA

 **Avoided Emissions and generation Tool (AVERT).** Tool that estimates the change in county-level emissions from energy efficiency or renewable energy. <https://www.epa.gov/avert>

 **Emissions and Generation Integrated Database (eGRID).** Power-plant level and state-level data on emissions, emissions rates, and fuel consumption. <https://www.epa.gov/egrid>

 **Power Sector Emissions Data.** Power-plant level data on emissions and generation. <https://www.epa.gov/airmarkets/power-sector-emissions-data>

U.S. Energy Information Administration (EIA)


 **Detailed State Data.** State-level data on electricity generation, fuel consumption, nameplate capacity, and retail sales of electricity. <https://www.eia.gov/electricity/data/state/>

 **Form 861.** Annual electric power industry report, with utility-level data on energy efficiency. <https://www.eia.gov/electricity/data/eia861/>

 **Form 923.** Power plant-specific data on electricity generation and fuel consumption. <https://www.eia.gov/electricity/data/eia923/>

 Emissions Data


 Activity Data


 Tool or Model

Fuel Combustion: Industrial, Commercial, and Residential



U.S. EIA

 **Adjusted Distillate Fuel Oil and Kerosene Sales by End Use.** State-level data on annual sales of distillate and residual fuel oil and kerosene. The drop down menu allows users to filter by state. https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_nus_a.htm


 **Annual Coal Report, Table 26.** Coal consumption data by end use sector, census division, and state. <https://www.eia.gov/coal/annual/pdf/table26.pdf>

 **Natural Gas Consumption by End Use.** State-level data on natural gas consumption by end use sector. https://www.eia.gov/dnav/ng/ng_cons_sum_a_EPG0_vin_mmc_f_a.htm

Petroleum and Related Industries



U.S. EIA


 **Crude Oil Production.** State- and Petroleum Administration for Defense District (PADD)-level data on crude oil production. https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbb_l_m.htm

 **Natural Gas Gross Withdrawals and Production.** State-level data on natural gas production. https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmc_f_m.htm

Other Industrial Processes




U.S. EIA

 **Manufacturing Energy Consumption Survey, Table 1.1.** Census region-level data on fuel consumption by NAICS Code. https://www.eia.gov/consumption/manufacturing/data/2014/pdf/table1_1.pdf

Waste Disposal and Recycling



U.S. EPA

 **Landfill Methane Outreach Program Database.** State-level data on waste in place and landfill gas collection systems. <https://www.epa.gov/lmop/project-and-landfill-data-state>


Energy Recovery Council

 **2018 Directory of Waste-to-Energy Facilities.** State-level data on waste-to-energy capacity. <http://energyrecoverycouncil.org/wp-content/uploads/2019/10/ERC-2018-directory.pdf>


Highway Vehicles and Off Highway Emissions



U.S. EPA

 **Motor Vehicle Emissions Simulator (MOVES).** Model that estimates county-level mobile source emissions by vehicle type. <https://www.epa.gov/moves>

U.S. EIA

 **Adjusted Distillate Fuel Oil and Kerosene Sales by End Use.** State-level data on annual sales of distillate and residual fuel oil and kerosene. The drop down menu allows users to filter by state. https://www.eia.gov/dnav/pet/pet_cons_821usea_dcu_nus_a.htm


U.S. DOE

 **Alternative Fuels Data Center.** State-level data on transportation fuel consumption. The drop down menu allows users to filter by state. <https://afdc.energy.gov/>

Argonne National Laboratory

 **Greenhouse gases, Regulated Emissions and Energy use in Technologies model (GREET).** Model that estimates the energy use and emissions from different vehicle and fuel combinations. <https://greet.es.anl.gov/index.php>

Federal Highway Administration

 **Highway Statistics.** State-level data on motor vehicle use, vehicle miles travel, vehicle registrations, and motor fuel consumption. <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>

¹U.S. Environmental Protection Agency. AP-42: Compilation of Air Emissions Factors. <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors>

²U.S. Environmental Protection Agency. 2017 National Emissions Inventory Technical Support Document. <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-technical-support-document-tsd>

³Note that you must convert from pounds to short tons before entering emissions inputs into COBRA.

