FACT SHEET

Sulfur Dioxide

Community Action to Promote Healthy Environments (CAPHE)

PROJECT PARTNERS:

Community Action Against Asthma

Detroit Community-Academic Urban Research Center

Detroit Future City

Detroit Hispanic Development Corporation

Detroiters Working for Environmental Justice

Green Door Initiative

Healthy Environments Partnership

Sierra Club

Southwest Detroit Environmental Vision

University of Michigan Schools of Public Health, Medical School & College of Architecture and Urban Planning

Wayne State University Law School

CONTACT INFORMATION:
Kristina Rice
Project Manager
klrice@umich.edu
(734)764-2955
www.caphedetroit.sph.umich.edu

March 2015

WHAT IS SULFUR DIOXIDE?

Sulfur dioxide (SO_2) is gas formed when fuel containing sulfur, such as coal and oil, is burned.[1,2] SO_2 is colorless and at high levels has an irritating odor like struck matches. You can be exposed outside if you breathe air that contains SO_2.

Combustion sources also emit several other sulfur gases, although the predominant one is SO_2. In the atmosphere, SO_2 can react with other pollutants, especially in the summer, to form sulfate particles.[2] These particles are tiny, and can penetrate deep in the lungs and cause many health effects. These particles can become acidified and cause 'acid rain.' This fact sheet focuses on SO_2.

WHAT ARE THE HEALTH EFFECTS OF SULFUR DIOXIDE?

Exposure to SO_2 has been associated with many serious health concerns. Short term exposure can cause: [2]

- Difficulty breathing
- Coughing and shortness of breath
- Irritation of the nose, throat, and lungs
- Stomach pain
- Menstrual disorders
- Watery eyes
- Inhibition of thyroid function
- Loss of smell
- Headaches, nausea, vomiting
- Fever, convulsions, and dizziness

DTE Energy's Monroe Power Plant (Photo: Bloomberg)

Long Term exposure can cause: [2]

- Chronic bronchitis, emphysema, and respiratory illness
- Aggravation of existing heart disease
- Decreased fertility in men and women

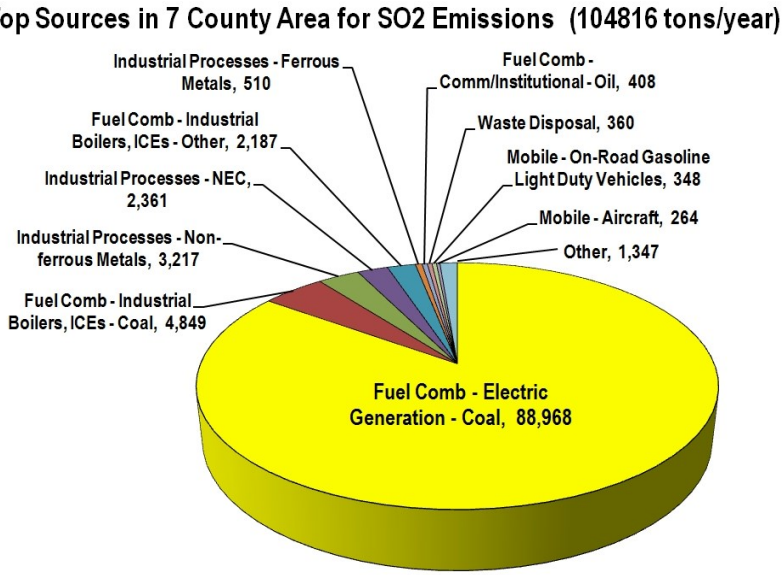
Children, the elderly, and people with asthma, cardiovascular disease or chronic lung disease (such as bronchitis or emphysema), are most susceptible to adverse health effects associated with exposure to SO_2. [1]

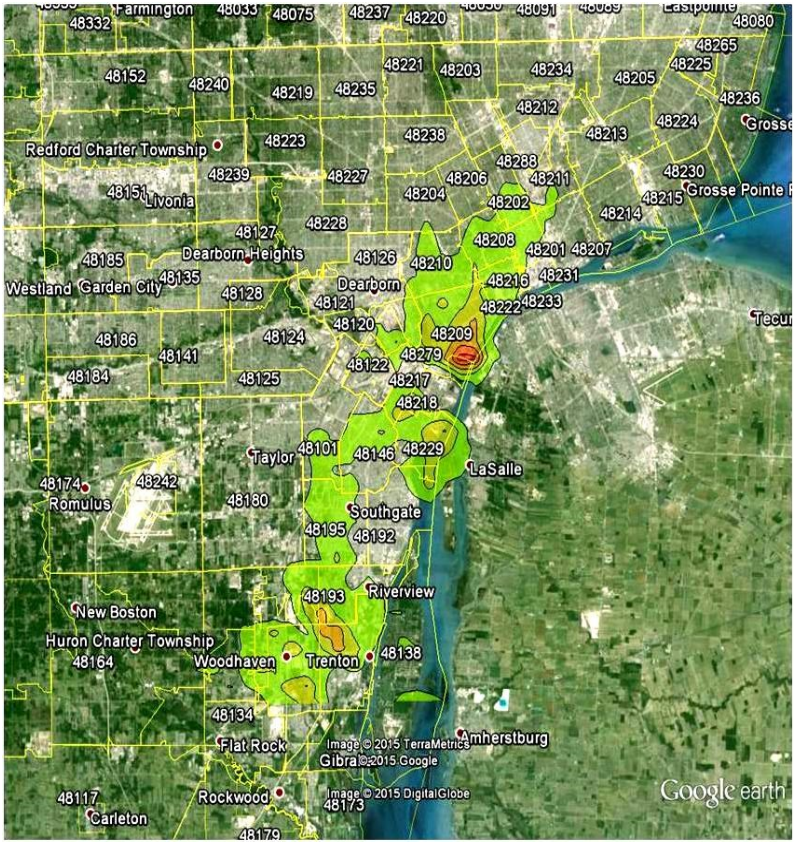
Support for this collaboration was provided R01ES022616 from the National Institute of Environmental Health Sciences, National Institutes of Health, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by grant P30ES017885.

WHAT ARE THE MAJOR SOUCES OF SULFUR DIOXIDE IN DETROIT?

In the southeastern Michigan area (7 counties), SO_2 emissions in 2011 were 105,000 tons, equivalent to nearly 12 tons of SO_2 emitted each and every hour of the year. Most (85%) of these emissions come from power plants burning coal to produce electricity.[3] The largest SO_2 emitters are in Monroe, Trenton, and River Rouge. The Monroe plant (shown overleaf) recently has been outfitted with scrubbers that greatly reduce emissions.

The pie chart to the right shows the major sources of SO_2 in the southeast Michigan area. These include the DTE coal-fired power plants in Monroe, Trenton Channel and River Rouge, and the US Steel Great Lakes facility in Ecorse.





WHO IS EXPOSED TO SO_2?

Because most of the SO_2 sources are along the Detroit River, people living or working in Southwest Detroit, Ecorse, Trenton, Lincoln Park, and Wyandotte areas have the highest exposure and the greatest risks of negative health effects due to SO_2 exposure.

The map to the left shows the expected higher exposure areas in green, orange and red (in order of increasing SO_2 levels). These areas are based on air quality modeling of Detroit-area SO_2 sources using allowable emissions. Modeling is used to predict the 4th highest 1-hour concentration, which is the form of the National Ambient Air Quality Standard for SO_2.

HOW CAN YOU LOWER EXPOSURE?

The Michigan Department of Environmental Quality (MDEQ) sets and enforces SO_2 ambient standards and emission limits. Petition MDEQ and your local decision makers to lower SO_2 emissions from industry, monitor air quality, and meet air quality standards with a margin of safety.

REFERENCES

1. Environmental Protection Agency. 2015. Sulfur Dioxide. http://www.epa.gov/airtrends/aqtrnd95/so2.html [accessed 3/3/15]
2. U.S. Library of Medicine. 2015. Sulfur Dioxide. http://toxtown.nlm.nih.gov/text_version/chemicals.php?id=29 [accessed 3/3/15]
3. National Emissions Inventory. 2011. Sulfur Dioxide. Emissions. http://www.epa.gov/med/grosseile_site/indicators/air-pollution.html [accessed 3/3/15]

ABOUT COMMUNITY ACTION TO PROMOTE HEALTHY ENVIRONMENTS

CAPHE uses a community-based participatory research approach in which partners are involved in all phases of the work. This includes defining the research problem, designing and implementing the study, interpreting and distributing the results, deciding how results will be applied and applying the results to create a public health action plan to improve health in Detroit. CAPHE builds on 15 years of community-academic research partnerships. Members from these long-standing partnerships serve on CAPHE's Core Team, Steering Committee and Public Health Action Team. This structure promotes collaboration and shared decision making at all levels of the CAPHE project, ensuring Detroit residents will have a significant voice in identifying and creating solutions to Detroit's air pollution problems.