



Sulfur Dioxide

Community Action to Promote Healthy Environments (CAPHE)

PROJECT PARTNERS:

Community Action Against Asthma

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Detroit Health Department

Detroit Hispanic Development Corporation

Detroiters Working for Environmental Justice

Green Door Initiative

Healthy Environments Partnership

Michigan Department of Environment, Great Lakes, and Energy (EGLE)

Sierra Club

Southwest Detroit Community Benefits Coalition

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WHAT IS SULFUR DIOXIDE?

Sulfur dioxide (SO₂) is a gas formed when fuel containing sulfur, such as coal and oil, is burned.^{1,2} SO₂ is colorless and at high levels has an irritating odor like struck matches. You can be exposed outside if you breathe air that contains SO₂.

Combustion sources also emit several other sulfur gases, although the predominant one is SO₂. In the atmosphere, SO₂ 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 SO₂.

WHAT ARE THE HEALTH EFFECTS OF SULFUR DIOXIDE?

Exposure to SO₂ 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

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 SO₂.¹



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

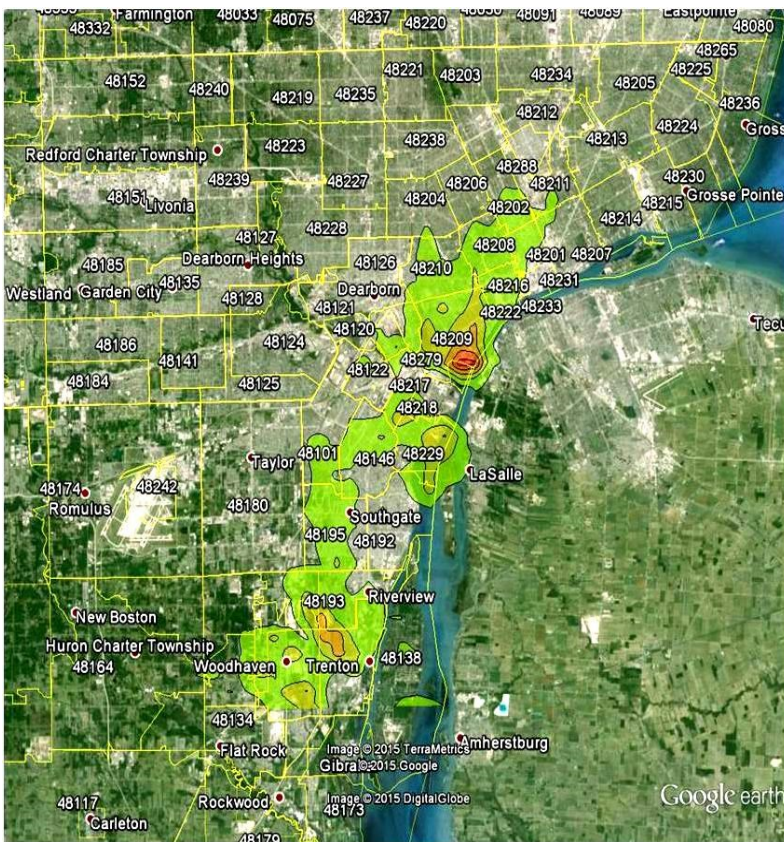
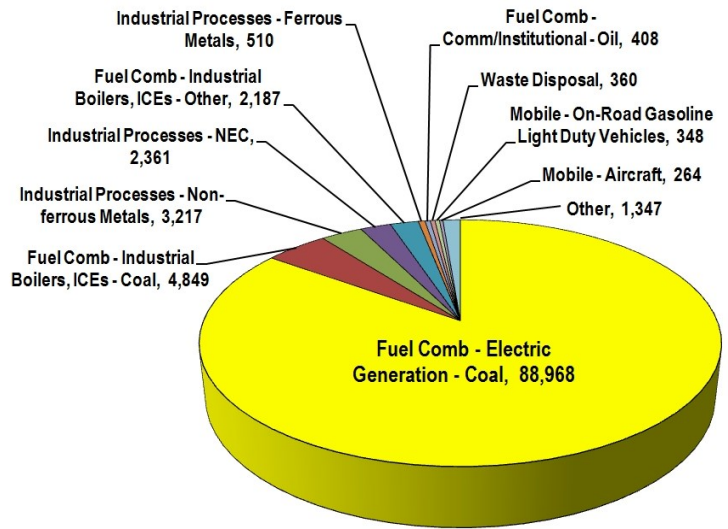


WHAT ARE THE MAJOR SOURCES OF SULFUR DIOXIDE IN DETROIT?

In the southeastern Michigan area (7 counties), SO₂ emissions in 2011 were 105,000 tons, equivalent to nearly 12 tons of SO₂ 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 SO₂ 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 SO₂ 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.

Top Sources in 7 County Area for SO₂ Emissions (104816 tons/year)



WHO IS EXPOSED TO SO₂?

Because most of the SO₂ 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 SO₂ exposure.

The map to the left shows the expected higher exposure areas in green, orange and red (in order of increasing SO₂ levels). These areas are based on air quality modeling of Detroit-area SO₂ 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 SO₂.

HOW CAN YOU LOWER EXPOSURE?

The Michigan Department of Environmental Quality (MDEQ) sets and enforces SO₂ ambient standards and emission limits. Petition MDEQ and your local decision makers to lower SO₂ 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/grosseille_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 20 years of community-academic research partnerships. Representatives from each of these organizations comprise the CAPHE Steering Committee. This structure promotes collaboration and shared decision making at all levels of the CAPHE project, to assure that Detroit residents and leadership have a significant voice in identifying and creating solutions to promote clean air for Detroit's residents.