

# Sulfur Dioxide

What's damaging the environment while also damaging our lungs? ✨THIS GUY!✨

## Who are we?

The four of us are environmental scientists for the Howard County government trying to figure out how to lower sulfur dioxide emissions in our community.



1 [Complete your work plan first!](#)

2

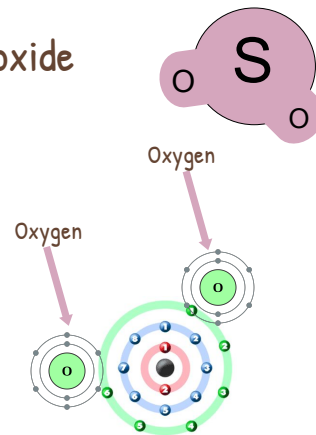
## Sulfur Dioxide

Sulfur Dioxide is one of the greatest concerns for our environment these days. It's the result of burning fossil fuels by power plants and transportation that burns fuel with a high sulfur content.



## The Chemistry of Sulfur Dioxide

Sulfur Dioxide has two oxygens connected to a sulfur atom. The sulfur atom has 16 protons, 16 neutrons, and 16 electrons. The two oxygen atoms have 8 protons, electrons, and neutrons. The atom has three shells with 2 electrons in the first, 8 in the second, and 6 in the third.



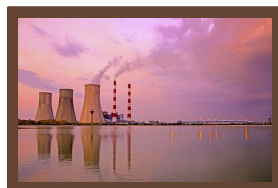
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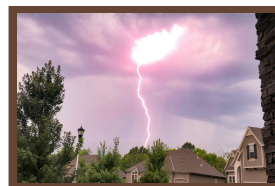
Where does **Sulfur Dioxide** come from?  
How is it produced?

-Sulfur Dioxide comes from many human activities. These include mostly burning fossil fuels, but also from driving vehicles, and smelting minerals. This is happening in places such as Louisiana, Hawaii, and even locally in Maryland.

-Sulfur dioxide is produced during incomplete combustion, when burning is happening without enough oxygen. This produces many pollutants including sulfur dioxide.



How do our local weather and climate help **Sulfur Dioxide** to get into our air?



-Maryland's local climate has short, hot, and humid summers along with longer, cold winters. Our prevailing wind pattern is east to west, coming from the ocean.

-This weather and wind are both pretty bad for sulfur dioxide. The humidity is good at keeping pollutants like it down, since it's water soluble. The winds are able to push it out of Maryland pretty well, too! These can all help lessen the effects of sulfur dioxide since we won't have as much of it present.

5

6

## How does our geography help Sulfur Dioxide to get into our air?

-Maryland is positioned next to the ocean and has rivers, plains, plateaus, and mountains.

-The presence of the ocean and mountains all in one can cause thermal inversions, and trap sulfur dioxide and other pollutants inside. The plains however, because they are on the west side of our state, allows wind to pass through and push pollutants out. The rivers and plateaus don't have much effect on the presence of sulfur dioxide. Other features that do effect sulfur dioxide include volcanoes and bays.

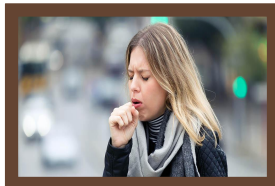


7

## Why is Sulfur Dioxide a problem?

-Sulfur dioxide can affect your health by irritating mucus membranes (eyes, throat and nose). It can also irritate and inflame your lungs, causing respiratory problems. This is quite serious, because if you have an existing condition this is known to worsen it severely, and may lead to death.

-Sulfur dioxide is very bad for the environment. This is because when high amounts are mixed with water and oxygen, sulfuric acid is made and creates acid rain. This can melt buildings, stop the growth of plants, and is toxic to people and animals. A safe level of sulfur dioxide would have to be under 0.14 ppm.



8

## Sulfur Dioxide

We believe that investing in scrubbers to remove sulfur dioxide from power plant gases as well as using more renewable energy will lower sulfur dioxide emissions.



The advantage of using renewable energy and scrubbers in power plants would be the lower sulfur dioxide pollution. However, there would be disadvantages like the cost of the scrubbers (\$5-\$10 million). These changes would be hard to adopt because it may be hard to convince the government to put millions of dollars into scrubbers for power plants as well as convincing the people in our community to try and ride their bikes or walk more when they can.

9

## Claim

If our community invested money to install a scrubber in local power plants that remove sulfur dioxide from gases leaving the smokestacks, then sulfur dioxide emissions would decrease. We also believe our community should encourage citizens to use more renewable energy sources to lower the amount of burning fossil fuels.

10

## Argument One:

### Evidence:

- We believe that encouraging citizens to use more renewable energy (riding a bike, walking, electric cars) would help improve air quality because sulfur dioxide can be produced through the burning of gasoline. So, if we lower the amount of gasoline burning we will be lowering the amount of sulfur dioxide emissions.

### Reasoning:

- Sulfur dioxide is a very dangerous pollutant and we need to do everything in our power to slow the growth of it even if it means using a less convenient way of transportation.



## Argument Two

### Evidence:

- We believe that these scrubbers would help human health and will clean up the air we breathe! Scrubbers help remove acid gases, such as sulfur dioxide. New systems have the potential for removal efficiencies of up to 98% according to EPA estimates!



### Reasoning:

- We have power plants pretty near our communities and homes. And 67% of sulfur dioxide comes from these power plants. Imagine how harmful that is! Filtering our air is the best we can do especially because it only has almost a 100% guarantee!



12

11



### Argument Three



#### Evidence:

- Sulfur dioxide is formed during the combustion of coal. The amount of sulfur dioxide produced depends on the sulfur content of the coal burned in a boiler. Scrubbers remove the Sulfur Dioxide from a boiler's combustion exhaust by passing it through an alkaline solution.



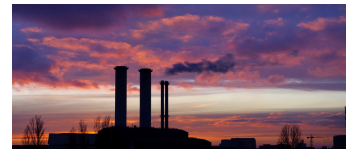
#### Reasoning:

- That decreases the amount of acid gas that goes into the air and the air that we breath! It's just a better way to use fossil fuels (if we do use any) and one step better to better breathing!



### In Summary:

Sulfur Dioxide comes from many human activities. These include mostly burning fossil fuels, but also from driving vehicles, and smelting minerals. Sulfur dioxide is formed during the combustion of coal, when burning is happening without enough oxygen. This produces many pollutants including sulfur dioxide.



We believe that investing in scrubbers to remove sulfur dioxide from power plant gases will lower sulfur dioxide emissions. Evidence that support this is scrubbers remove the Sulfur Dioxide from a boiler's combustion exhaust by passing it through an alkaline solution. That decreases the amount of acid gas that goes into the air and the air that we breath! New systems have the potential for removal efficiencies of up to 98% according to EPA estimates!

## Sources Used

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## Work Plan

**Group Member Tori**  
Responsibilities/Tasks:  
 Slides 9-11

**Group Member Rachel**  
Responsibilities/Tasks:  
 Slides 12-15

**Group Member Quinn**  
Responsibilities/Tasks:  
 Title Slide

**Group Member Emily**  
Responsibilities/Tasks:  
 Slides 5-8