

Detrimental Health Effects of Coal Pollutants

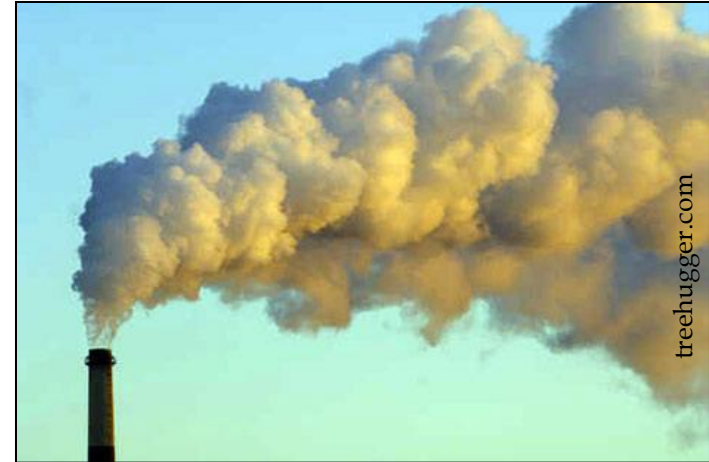
Dr. Jennifer Glenn Wiregrass Energy Network

Coal Combustion Pollutants

Coal combustion releases

over 110 hazardous chemicals¹

- gaseous byproducts → emitted into the atmosphere via smokestack
- solid byproducts → smokestack; solid waste



particulate matter (PM)
sulfur dioxide (SO₂)

mercury (Hg)
nitrogen dioxide (NO₂)

coal ash

- damage the **respiratory, cardiovascular, and nervous systems⁷**
- contribute to 4 of the top 5 leading causes of death in US: **heart disease, cancer, stroke, and chronic lower respiratory diseases⁷**
- Of utility-rated pollution, coal plants emit approximately³⁰:
87% NO₂ pollution, 94% SO₂ pollution, 98% mercury pollution

Particulate Matter (PM)

- **What is it?**

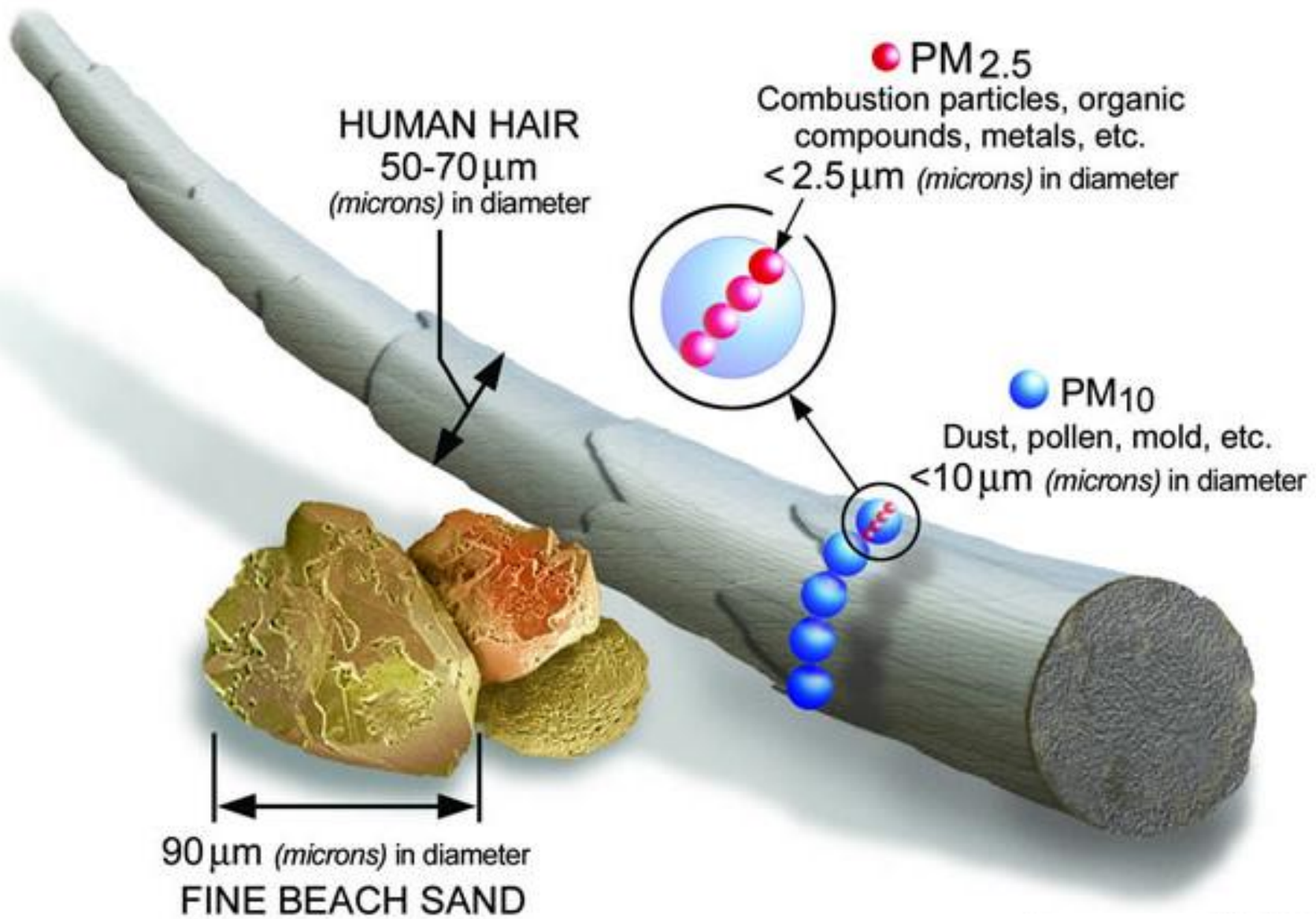
- A complex mixture of **extremely small particles and liquid droplets** containing **acids** (such as nitrates and sulfates), **organic chemicals, metals, soil, dust**²

- PM₁₀ - diameter < 10 microns
- PM_{2.5} - diameter < 2.5 microns

- **How is it produced?**

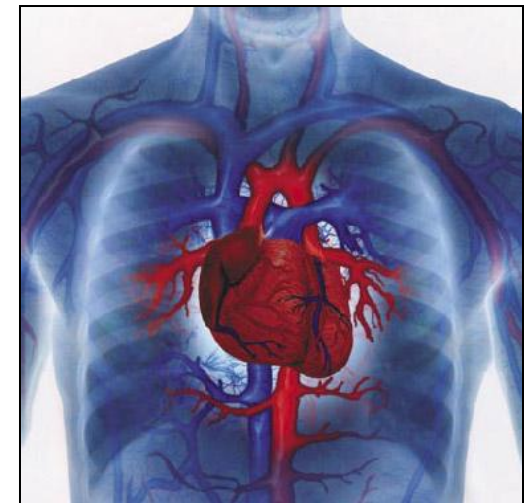
- directly emitted from coal burning.
 - US coal plants will release an estimated 217,000 tons PM₁₀ and 110,000 tons PM_{2.5} in 2010³¹
- indirectly formed by reaction of SO₂ and NO₂ (emitted during combustion).





Health Effects of PM

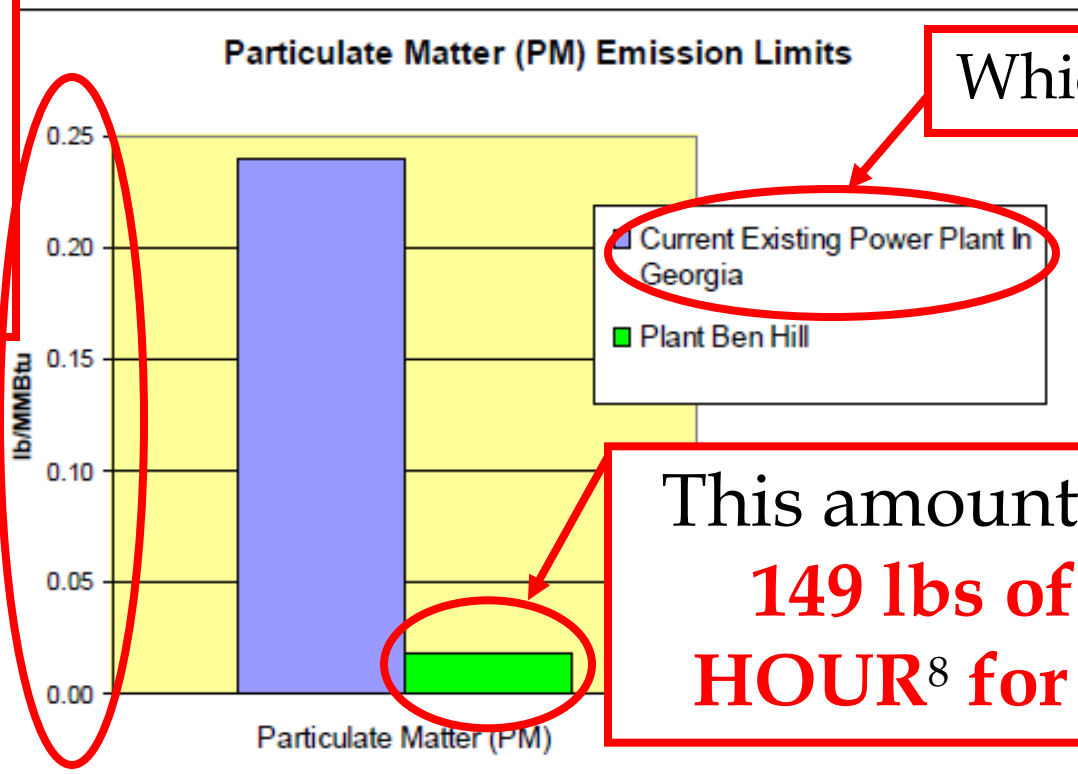
- increased respiratory symptoms (airway irritation, coughing, difficulty breathing)^{3, 4, 5}
- development/aggravation of asthma^{3, 4, 5, 6}
- chronic bronchitis^{3, 4, 5}
- increased susceptibility to respiratory infections⁵
- chronic obstructive pulmonary disease (COPD)⁷
- lung cancer^{7, 33}
- inflammation of the cardiac system⁷
- heart attack^{3, 7} and congestive heart failure⁷
- ischemic stroke⁷
- increased hospital admissions and emergency room visits⁵
- premature death^{3, 4, 5, 33}



P4G Plant Ben Hill Presentation

use of unfamiliar units in order to report smaller numbers

Best in State Emissions - PM



Which plant?

This amount is equal to **149 lbs of PM per HOUR⁸ for ~50 years**

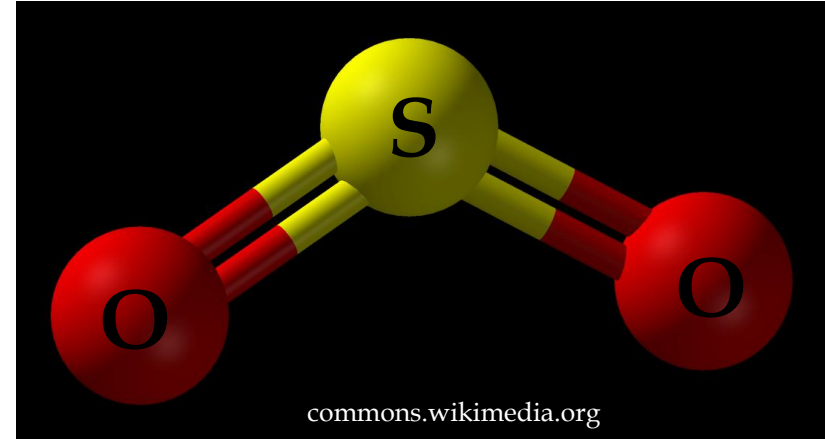
Plant Ben Hill would be "best in state" when compared to similar generation

compared to **decades-old** technology

Values presented above reflect those of recent years

Sulfur Dioxide (SO₂)

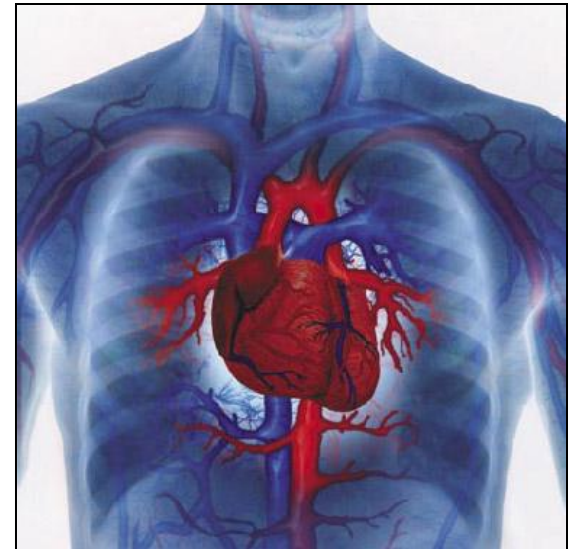
- **What is it?**
 - Highly corrosive, invisible gas
 - Respiratory irritant
- **How is it produced?**
 - The sulfur that naturally occurs in coal is converted to SO₂ upon combustion.
- In the atmosphere SO₂ can react to create⁴:
 - sulfuric acid
 - acidic particulate matter



Coal plants are the single largest source of SO₂ pollution³⁰

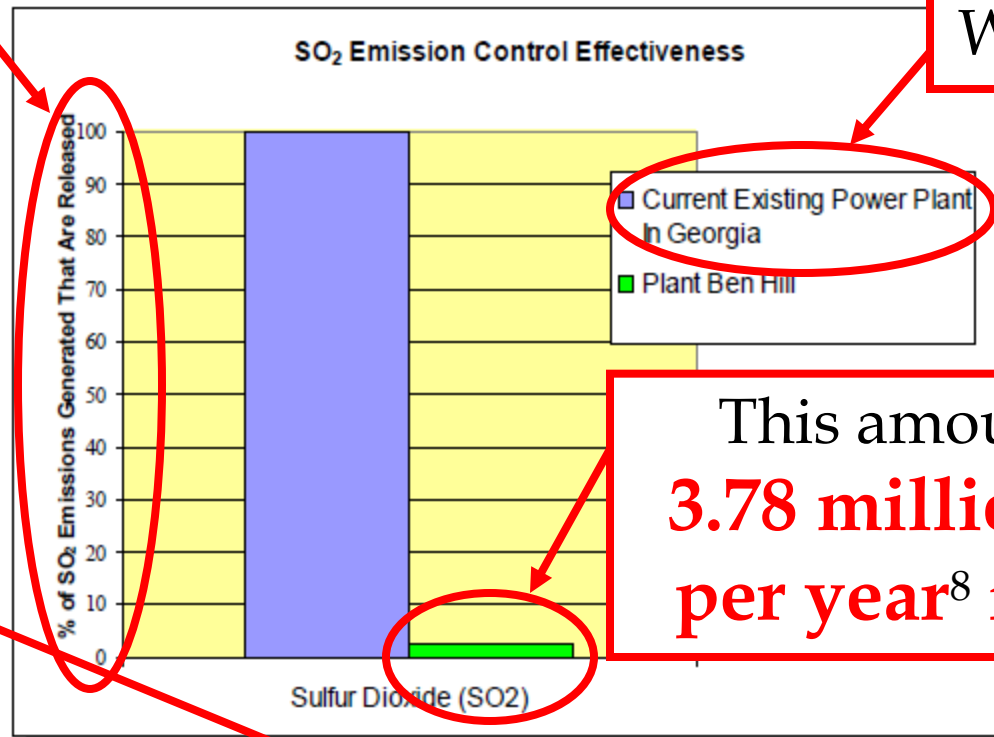
Health Effects of SO₂

- involved in PM formation - contributes to health issues associated with PM
- coughing, wheezing, shortness of breath⁶
- cause/worsen respiratory disease (bronchitis and emphysema)⁹
- exacerbates asthma⁶
- increased emergency room visits & hospitalization for respiratory illnesses⁹
- aggravation of existing heart disease^{4, 9}
- can destabilize heart rhythms⁶
- ischemic stroke⁷
- premature death⁹



P4G Plant Ben Hill Presentation

Best in State Emissions – SO₂



compared to "other" plant that releases **ALL** of their SO₂ emissions

Which plant?

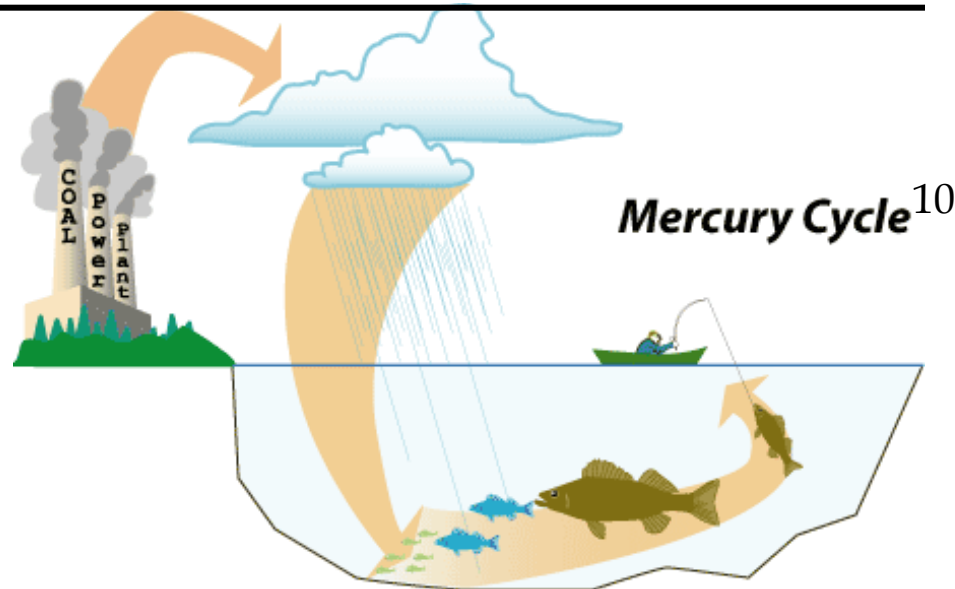
This amount is equal to **3.78 million lbs of SO₂ per year⁸ for ~50 years**

Plant Ben Hill would be "best in state" when compared to similar generating facilities in Georgia.

compared to **decades-old** technology

Mercury (Hg)

- **What is it?**
 - A metal that occurs naturally in coal.
- **How is it produced?**
 - Mercury is released when coal is burned.

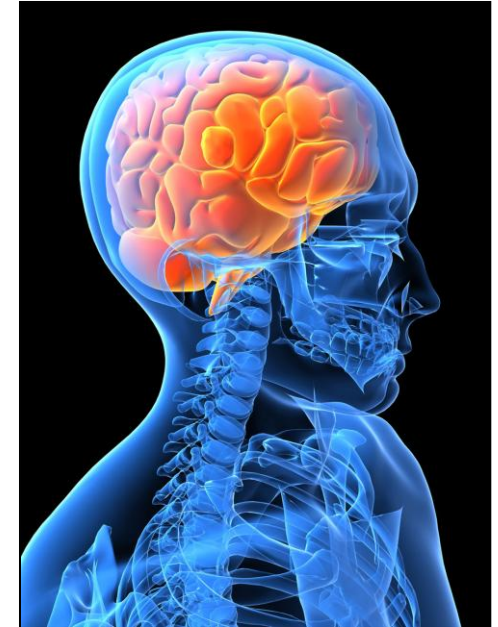


The 1999-2000 National Health and Nutrition Examination Survey for 16-to-49 year old women showed that approximately **8% had blood mercury concentrations greater than the level deemed safe by EPA.**³⁴

Researchers have estimated that between **317,000 and 631,000 children** are born in the U.S. each year with blood mercury levels high enough to **impair performance on neurodevelopmental tests** and cause **lifelong loss of intelligence.**⁷

Health Effects of Hg

- harms the brain, heart, kidneys, lungs, and immune system of people of all ages¹⁰
- in fetuses, infants, and children:
 - reduced IQ⁷
 - mental retardation^{7, 13}
 - permanent loss of intelligence⁷
 - delays walking and talking, shortens attention span, causes learning disabilities¹²
 - brain damage, incoordination, blindness, seizures, and inability to speak¹³
 - developmental delay in language, attention, reaction time, and memory¹¹



<http://www.brainspan.co.uk/brain-in-head.jpg>

Coal plants
are the single
largest source
of Hg
pollution³²

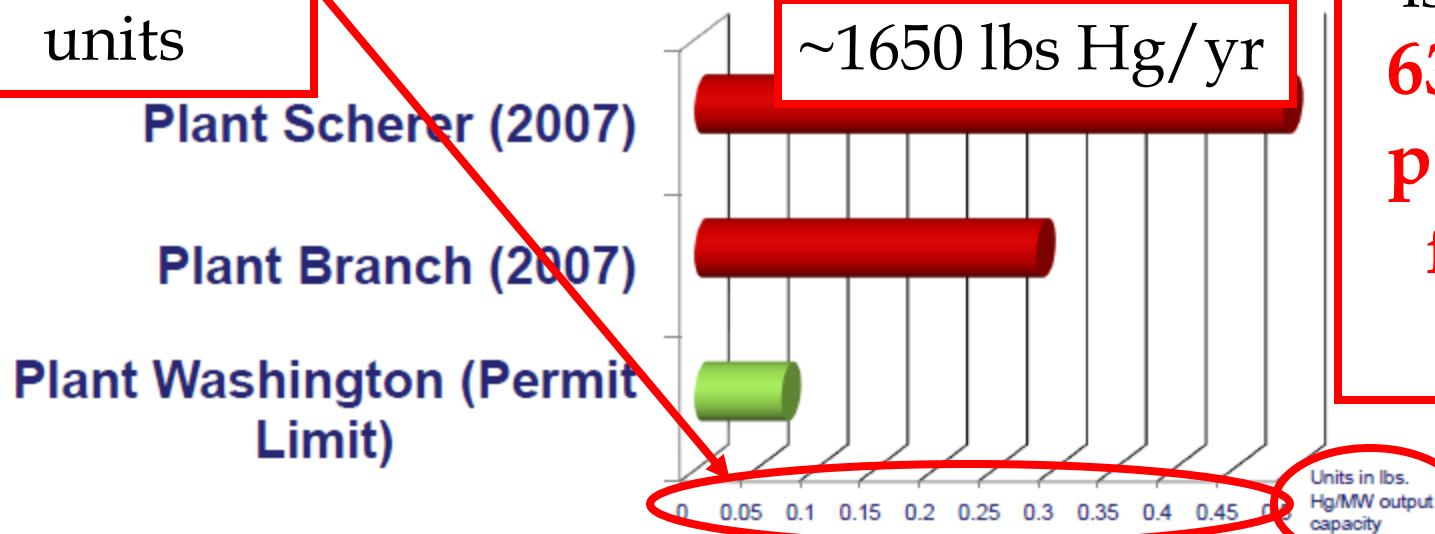
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Best in State Emissions - Mercury

Mercury Emissions Comparison

small scale
is deceiving;
check the
units

This amount
is equal to
**63 lbs Hg
per year¹⁴
for ~50
years**



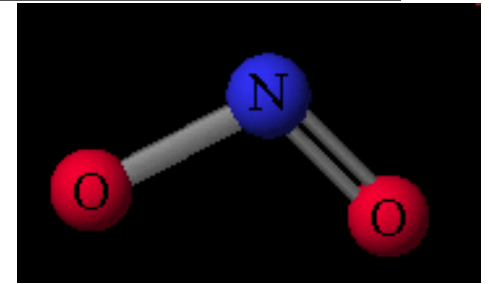
1/70th of a teaspoon of Hg deposited on a 25-acre lake can make the fish unsafe to eat¹⁵

In 2006, Plant Scherer was the second largest mercury polluter in the US¹⁶

Nitrogen Oxides (NO_x)

- **What is it?**

- A family of chemical compounds including nitrogen oxide (NO) and nitrogen dioxide (NO_2 – a respiratory irritant)



physics.ohio-state.edu

- **How is it produced?**

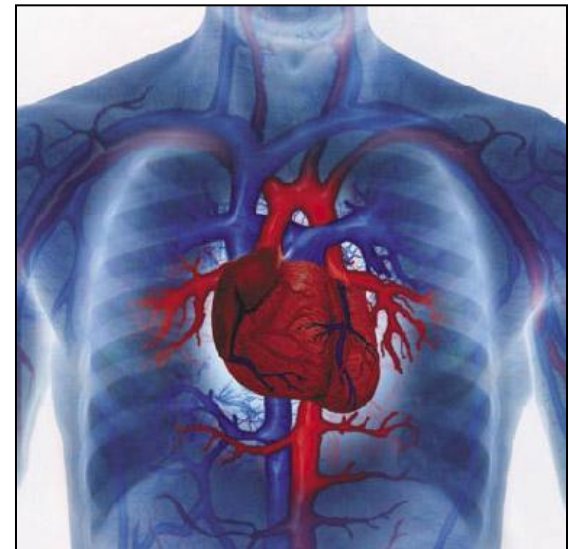
- The nitrogen that naturally occurs in coal and air is converted to NO_x upon combustion.
- In the atmosphere NO_x can react to create^{17, 18}:
 - nitric acid
 - acidic particulate matter

Coal plants are the 2nd largest source of NO_2 pollution³⁰

**2.69 million lbs
 NO_2 per year⁸
for ~50 years**

Health Effects of NO_x

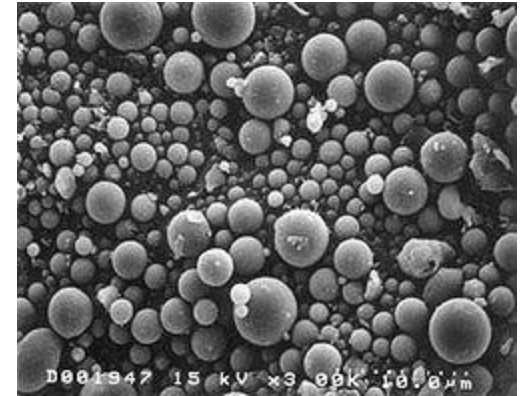
- involved in PM formation⁴ - contributes to health issues associated with PM
- causes/worsens respiratory problems (asthma, emphysema and bronchitis)^{7, 19, 20}
- irritation or damage to lung tissue^{4, 19}
- lowers resistance to respiratory infections (flu)⁴
- chronic obstructive pulmonary disease (COPD)⁷
- stunted lung development⁷
- ischemic stroke⁷
- aggravates existing heart disease^{19, 20}
- increased hospitalizations²⁰
- premature death^{19, 20}



Coal Ash

- **What is it?**

- Coal ash is the waste left over after coal is burned. It is composed of fly ash and bottom ash.



- Depending on the composition of the coal being burned, coal ash may contain²¹:

arsenic

aluminum

cobalt

zinc

lead

antimony

manganese

dioxins

mercury

barium

molybdenum

radioactive

cadmium

beryllium

nickel

elements²²

chromium

boron

thallium

polyaromatic

selenium

chlorine

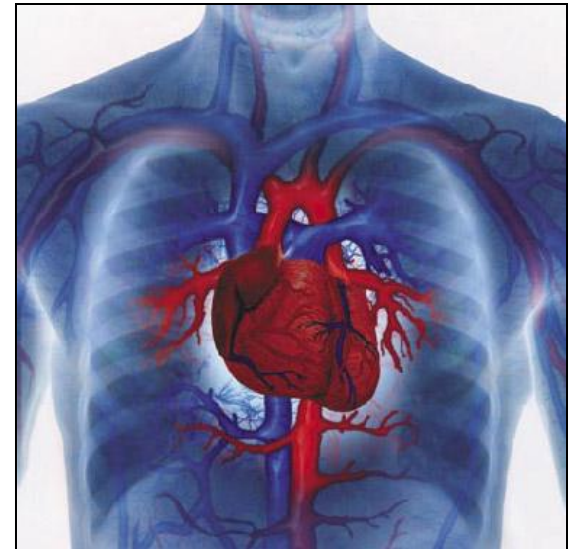
vanadium

hydrocarbons

- Coal ash is the 2nd largest industrial waste stream in US²³

Health Effects of Coal Ash

- heavy metals cause cancer^{24, 25}
- nervous system impacts^{24, 25}
 - cognitive deficits, developmental delays, behavioral problems
- heart damage²⁴
- lung disease²⁴
- respiratory distress²⁴
- kidney disease²⁴
- reproductive problems^{24, 25}
- gastrointestinal illness²⁴
- birth defects²⁴
- impaired bone growth in children²⁴
- organ failure²⁵



Recycling Coal Ash?

- EPA Administrator Lisa Jackson stated that she has “no data to say that [coal ash re-use] is safe at this point.”²⁶
 - Dominion Virginia Power supplied 1.5 million tons of coal ash to use as structural filler for a golf course in Chesapeake, Virginia – toxins from the ash leached into groundwater and contaminated surrounding neighborhoods.²⁷
 - Two lawsuits filed against Dominion: \$1 billion for damages and \$1.25 billion for cleanup; millions more to pay for properties, homes, medical bills.²⁷
- The US EPA is considering regulating coal ash as **hazardous waste**²⁸



Pollutants Not Mentioned in P4G Presentation⁸

nitrogen oxides (NO_x)
2,690,000 lb/yr

coal ash (heavy metals/radioactive compounds)
533 lb/yr of mercury and 53,333 lb/yr of arsenic²⁹

volatile organic compounds (VOCs)
174,000 lb/yr

carbon monoxide (CO) **hydrogen fluoride (HF)**
7,284,000 lb/yr 19,480 lb/yr

sulfuric acid mist (SAM) **carbon dioxide (CO₂)**
290,000 lb/yr 13.8 billion lb/yr

lead (Pb) **hazardous air pollutants (HAP)**
1163 lb/yr 81,600 lb/yr

**Plant
Ben
Hill**

What Can You Do Right Now?

Contact County and City Officials

- Call, send letters, and email the Mayor, County Commissioners, the Board of Health, and the Fitzgerald-Ben Hill County Development Authority.

Attend County Commission Meetings

- Upcoming meeting dates: Sept 7, Oct 12, Nov 2, Dec 14

Write Letters to the Editor

- Write Tim Anderson, Editor of the Herald-Leader
tandersonherald@gmail.com; 229-423-9331

Have a question or want to help?

- email WEN at wiregrass.energy.network@gmail.com

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Speak Up Against Power Plant Pollution

Power plant pollution doesn't just foul the air in a community—it spews across state lines. States can't stop pollution coming in at their borders by themselves. But you can help. In the coming weeks, you can Fight for Air, along with the American Lung Association and our partners at three U.S. Environmental Protection Agency (EPA) hearings focused on cleaning up those power plants. The EPA is trying to reduce power plant pollution through its Transport Rule. The Transport Rule will cut power plant pollution that begins in one state, then spreads to entirely different parts of the country. Pollution spewed across state lines from these power plants kills between 14,000 and 36,000 people each year.

The EPA will host public hearings for the Transport Rule August 19, in Chicago; August 26, in Philadelphia; and September 1, in Atlanta. The Lung Association and our allies will be speaking at each of these hearings to show the importance of reducing that deadly pollution. We need you to speak up, to tell EPA and the polluters that it is time for those coal-fired power plants to stop spewing pollution into your state. If you're interested in speaking up in the Fight for Air, check out the information below and sign up for a hearing close to you. If you can't attend, you can still help. Click [here](#) to send your comments to EPA.

Make Your Voice Heard

Speaking up is easy. Show up at one of these hearings and tell them what you think. Click on the location below to get information on that hearing and talking points: