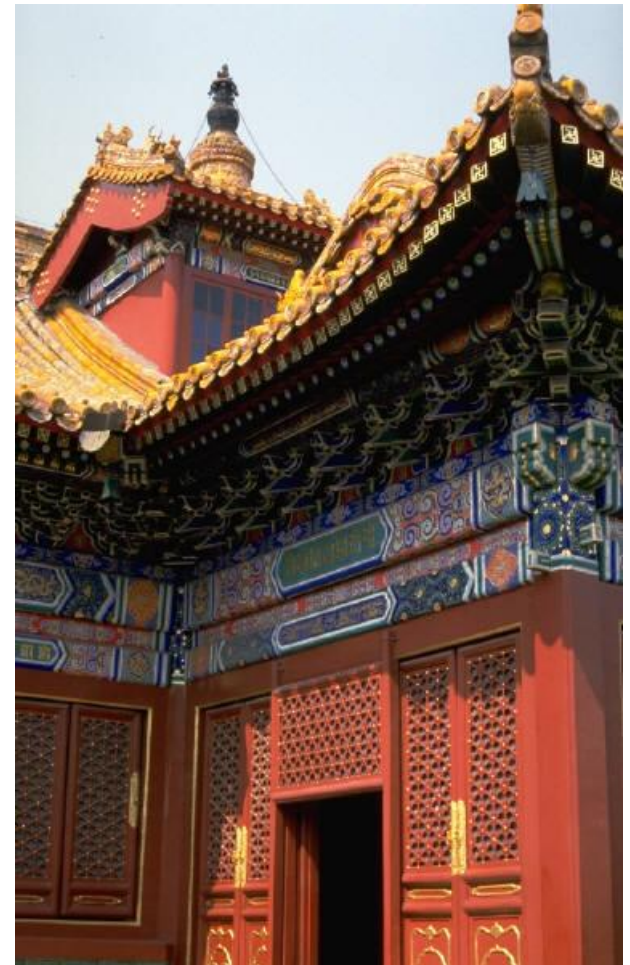


Air Pollution in China

Learning Goals

- What are some negative effects of *outdoor* air pollution?
- What are some negative effects of *indoor* air pollution?
- What are some major pollutants that engineers and scientists are concerned about?



Where in the world is China?



How many people live in China?

...about 1.3 billion people!

- China is a fascinating country with a very long history
- China's economy is growing very quickly
- One consequence of growth is increased pollution



Which two countries in the world use the most energy?

- **China** uses the most energy overall
- The **U.S.** uses the most energy *per person*



We can work together to use clean energy and take good care of the Earth

Pollution in Rural China

- Many people live in the countryside, in rural areas
- Some of these people are very poor
- Some of them live on \$1, \$2, or less than \$5 per day

This is a picture of a village
in southwestern China →



© Abigail Watrous

Solid Fuels



- Many people who live in the countryside in China use solid fuels to cook meals and heat their homes
- Solid fuels include coal, corn stalks, wood, and other types of biomass
- Burning these fuels in a stove that is not very good, or doesn't have a chimney, releases a lot of pollution into the air, which is damaging to people's health.

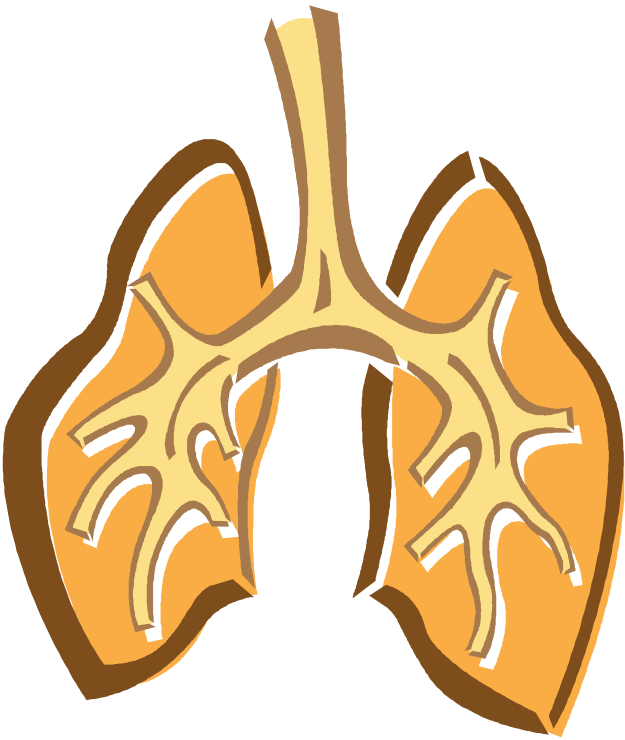
← This is a small coal stove, called a “cookstove”

Health Effects of Indoor Air Pollution

- Nearly 3 billion people in the world use solid fuels for cooking
- One of the most dangerous emissions from these fuels is $PM_{2.5}$ (**particulate matter 2.5**)
- $PM_{2.5}$ are very small particles that get deep into your lungs when you breathe
- These particles, along with other emissions, can cause serious health conditions
- Scientists and engineers are investigating to find better ways for people without much money to cook their meals and heat their homes



Health Effects of Indoor Air Pollution



Negative health effects of indoor air pollution include:

- acute respiratory infections
- chronic obstructive pulmonary disease (COPD)
- lung cancer

Possible other health effects include:

- cataracts
- low birth weight

Urban Pollution

- China has many VERY big cities
- Beijing, the capital city, has more than 22 million people
- That's more than twice the population of New York City (about 8 million)
- Many people are moving from the countryside into the cities, where much new construction is happening
- As people get more money, they are buying cars — at one point, Beijing was getting 2,000 new cars every day!



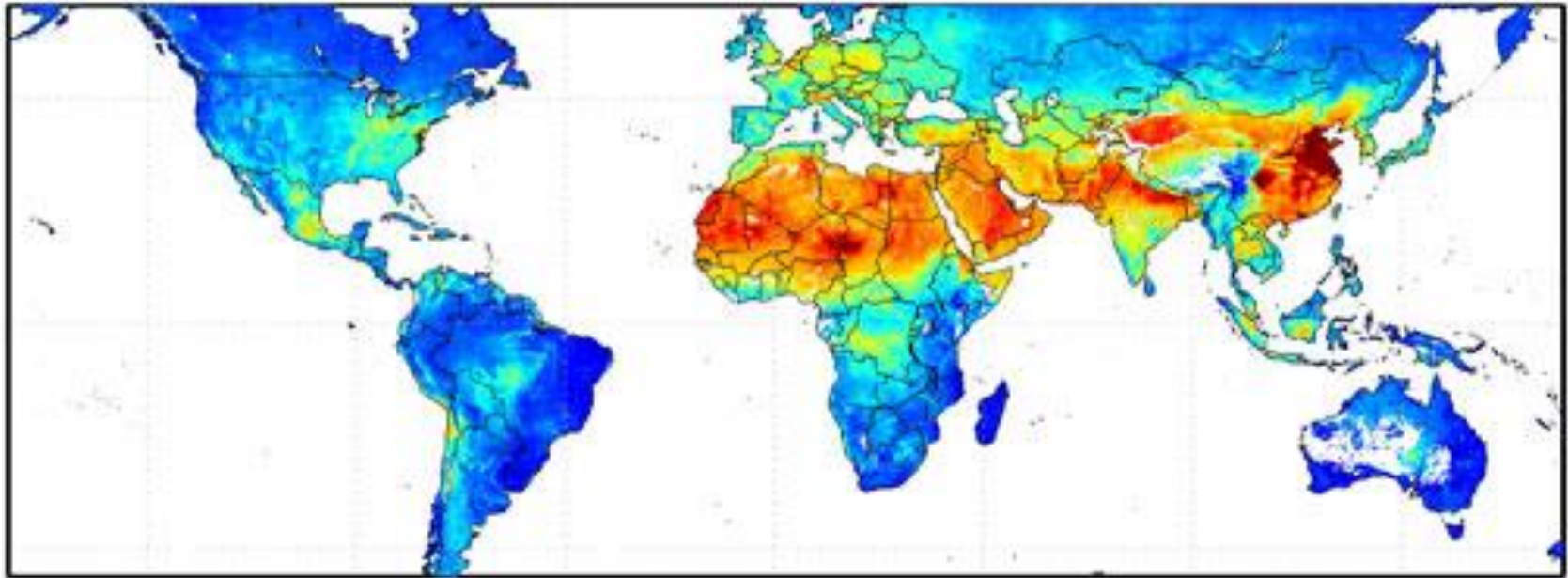
Outdoor Air Pollution

- All of the people in the cities need to use energy, too!
- Scientists and engineers are very concerned about the rising levels of outdoor air pollution



- Two pollutants they are especially worried about are $PM_{2.5}$ and CO_2 (carbon dioxide)
- CO_2 at low levels is good, but too much may really hurt the Earth

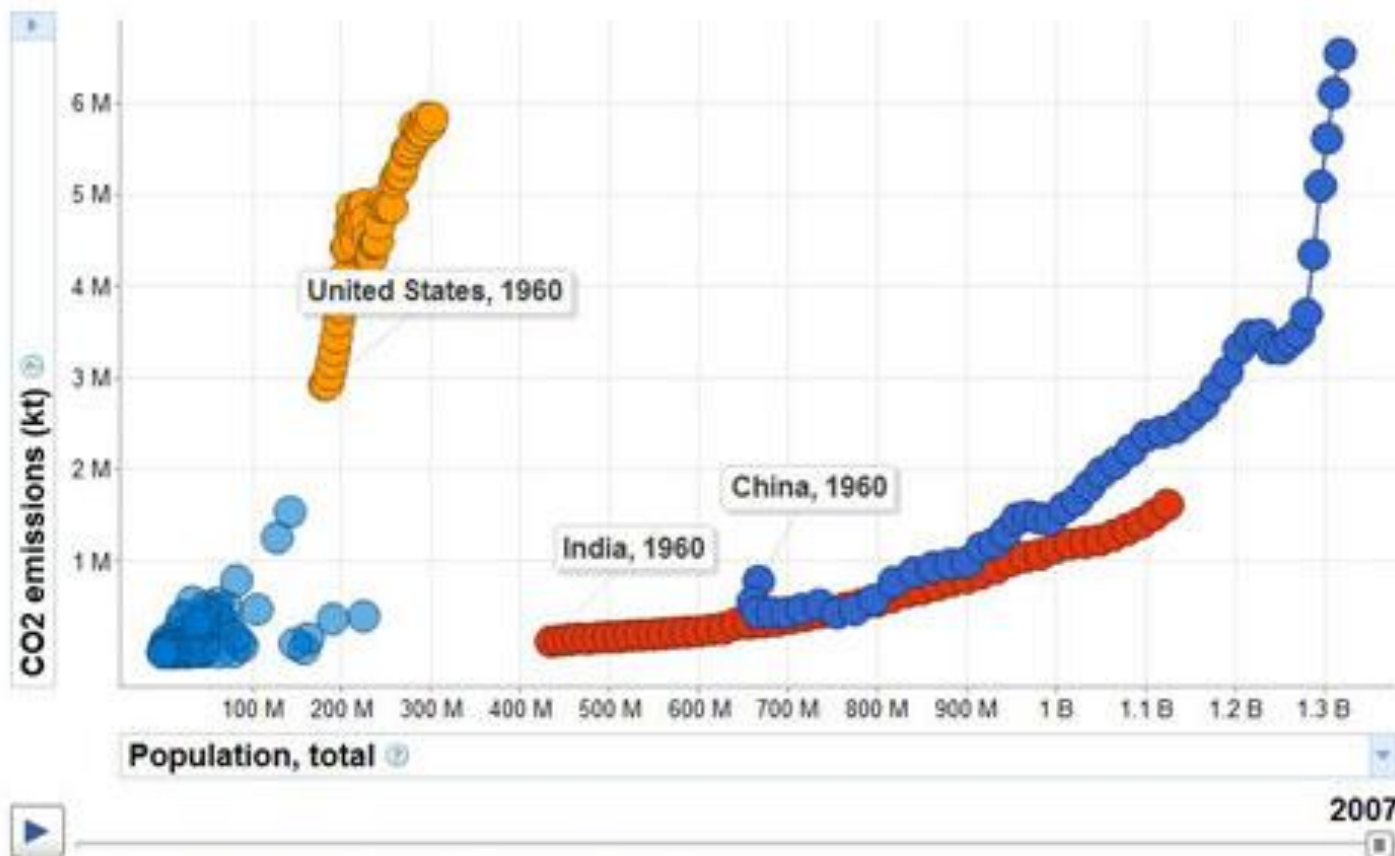
Global PM_{2.5} Levels



2001-06 average from NASA

Increase of carbon dioxide over time as population increases

What are three things you notice in looking at this graph?



Time period: ~1960 - 2007

Google public data explorer
labs

Source: <http://www.google.com/publicdata/directory>

Outdoor Air Pollution

Some negative effects of outdoor air pollution include:

- acid rain
- ozone depletion
- global warming
- climate change



What can people in the city do to save energy?

- Turn off lights when they leave a room
- Use energy-saving light bulbs
- Walk, take the subway, or ride bicycles to work
- Don't buy a personal car
- Factory owners can install special machines to help reduce air pollution emissions from their factories



Some Chinese words to learn:

- Ni hao 你好
- Ni hao ma? 你好吗?
- Wo hen hao 我很好
- Zai jian 再见
- Da jia hao 大家好
- Lao shi hao 老师好
- Hello
- How are you?
- I'm very good
- Goodbye
- Hello everyone
- Hello teacher!

Learning Goals Answers

Negative effects of outdoor air pollution:

- acid rain
- ozone depletion
- global warming
- climate change

Negative effects of indoor air pollution:

- chronic obstructive pulmonary disease
- lung cancer
- acute respiratory infection
- possibly: cataracts and low birth weight

Major pollutants engineers and scientists are concerned about:

- CO₂ (carbon dioxide)
- PM_{2.5} (particulate matter 2.5)



the end

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