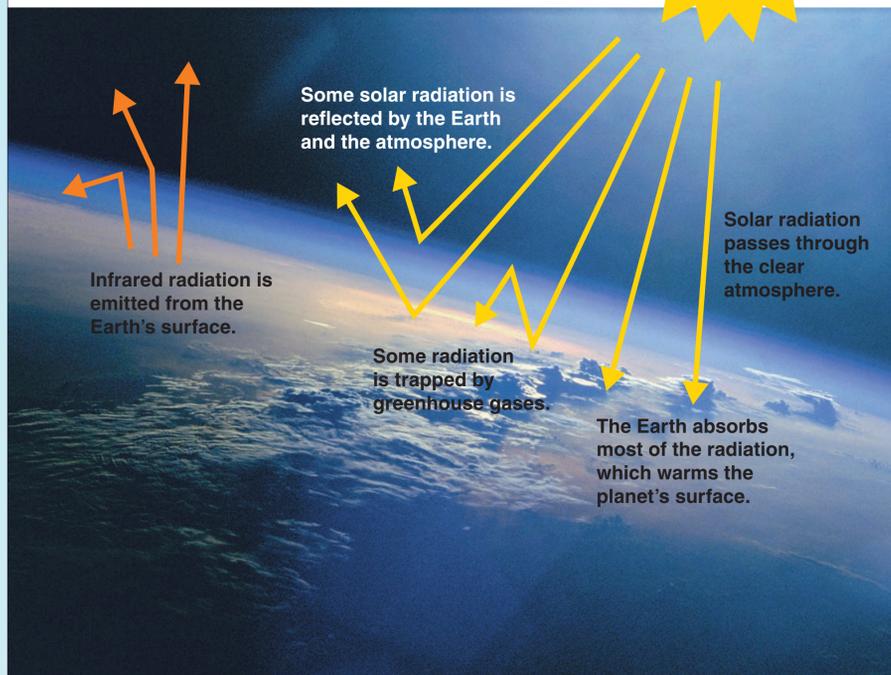


# Carbon Capture and Sequestration: Bridging the Gap

## Greenhouse Effect

Some solar radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. This process warms the Earth's surface and lower atmosphere.



- In 1827, J. B. J. Fourier discovered the greenhouse effect.
- The atmosphere warms the planet by trapping the Earth's heat. The gases in the atmosphere raise the average temperature approximately 60°F.

Figure modified from www.epa.gov

## Global Warming

Global warming is the average increase in the Earth's temperature over time.

- The Earth's temperature has changed over geologic history.
- Average temperatures have increased 1°F over the past century. Leading scientists think humans have contributed to this increase in emission of greenhouse gases.

## Common Greenhouse Gases

Carbon dioxide (CO<sub>2</sub>)

- Emissions come from burning fossil fuels (oil, natural gas, and coal).

Methane (CH<sub>4</sub>)

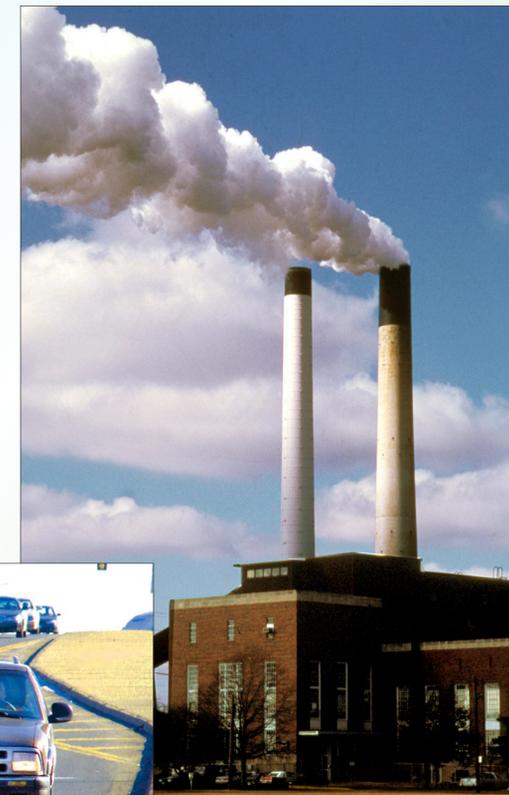
- Emissions come from landfills, rice paddies, livestock, organic waste such as sewage, and coal seams.

Nitrous oxide (N<sub>2</sub>O)

- Emissions come from fertilized croplands and burning fossil fuels.

Water vapor (H<sub>2</sub>O)

- Emissions come from natural sources, industrial processes, and transportation.



## Carbon Sequestration

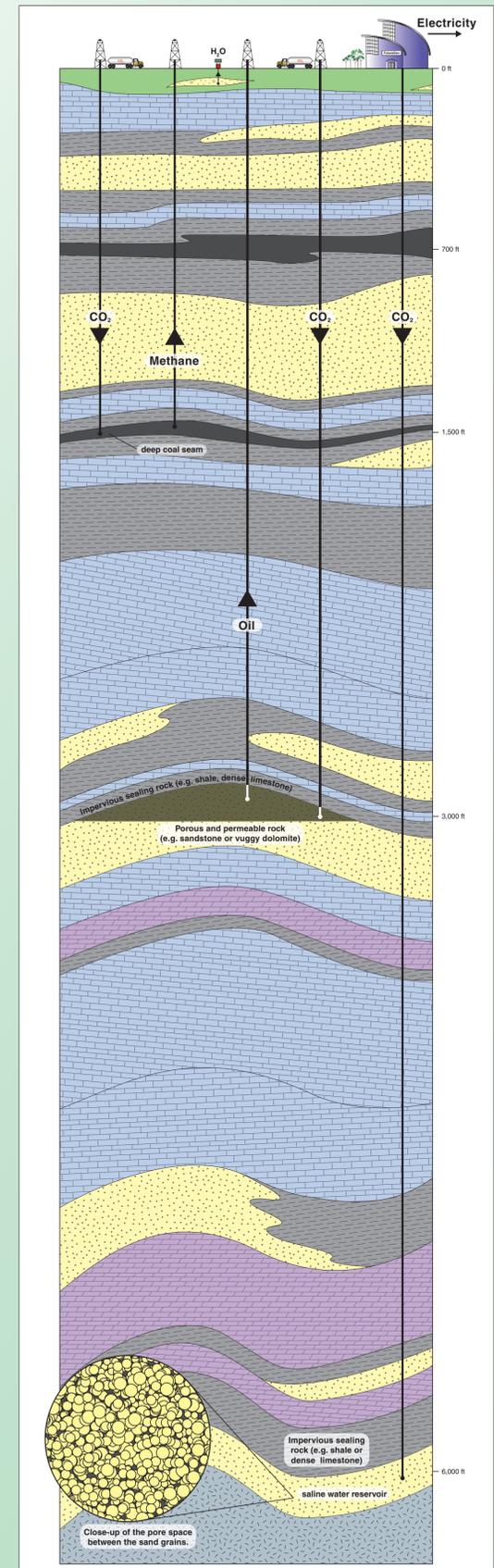
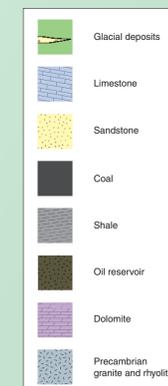
Carbon sequestration is the capture of carbon dioxide from point sources before the gas enters the atmosphere. Reducing the amount of CO<sub>2</sub>, a greenhouse gas, emitted into the atmosphere may help slow global warming.

Sequestration options:

- Geologic sequestration stores carbon underground in coal seams, saline aquifers, or oil reservoirs.
- Terrestrial sequestration stores carbon in soils, crops, or other plants.
- Oceanic sequestration stores carbon at the bottom of the ocean.

The Illinois Basin is a good place for geologic sequestration:

- The Basin offers long-term storage deep in the Earth.
- Side benefits may include enhanced recovery from oil reservoirs and methane from coal seams.



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